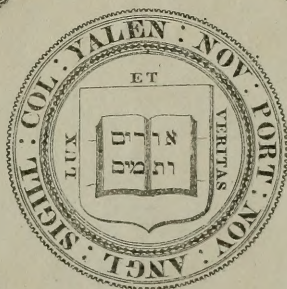


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NEW REMEDIES:

THE

METHOD

OF

PREPARING AND ADMINISTERING THEM;

THEIR EFFECTS

ON THE

HEALTHY AND DISEASED ECONOMY, &c.

PRODESSE QUAM CONSPICI.

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PREFACE.

THE information, concerning the remedies of more recent introduction, lies scattered in so many works, that it cannot be accessible to the mass of physicians. The author has, consequently, believed, that he would be rendering a service to the profession by concentrating the results of experience within reasonable limits, so that they may be readily available to all. The majority of the new agents—it will be found—have been furnished by modern chemistry; and their employment has been attended with this advantage, that—when properly prepared—they are not liable to uncertainty in their operation; whilst the various plants from which the strychnine, emetine, quinine, &c. are obtained, are liable to irregularity of action, owing to faults in desiccation, to the season in which they are culled, &c. &c.—objections which cannot apply to the active principles when separated from them.

The author has esteemed it proper to give—as far as he was able—the recorded experience of all who have employed the remedies in question, owing to the difficulty of sifting the results of true from those of false observation.

It need scarcely be said, that to make a correct observer and a good therapist, a knowledge of every department of medical science is demanded. Anatomy, physiology, pathology, and materia medica are, indeed, but introductory to the great object which the practitioner has in view—the alleviation and removal of suffering. Were it otherwise, it would be but necessary to institute empirical trials, in every case of disease, with various articles in and out of the received lists of the materia medica, and from such vague trials to endeavour to deduce what is termed “experience.”

The erroneous idea prevails too extensively, that every one is capable of profiting by observation, and that, therefore, all who

have had the same amount of experience, must be equally capable of treating disease. Setting aside, however, the consideration of the differences that must necessarily result from the varied powers of individuals, it can scarcely be maintained, that he, whose attention has not been properly directed to the study of the preliminary branches, which have been enumerated, and whose mind has not been trained in tracing the relation between cause and effect, can ever duly profit by mere experience in that which has been properly termed "the most inductive of all sciences."¹

To treat disease methodically and effectively, the nature of the actions of the living tissues, in both the healthy and morbid conditions, must be correctly appreciated; the effects, which the articles of the *materia medica* are capable of exerting under both those conditions, must be known from accurate observation, and not until then can the practitioner prescribe with any well-founded prospect of success. Numerous errors would be perpetrated, were we to profess, and to carry out such profession, that we are guided by experience only, unless that experience had been gained by a due consideration of all the physiological, pathological, and therapeutical bearings of the subject. In illustration of this, the well-known case, cited by Dr. Paris, in his *Life of Sir Humphry Davy*, may be adduced. The enthusiastic Beddoes, having hypothetically inferred, that the inhalation of the nitrous oxide might be a specific for palsy, a patient was selected for trial, and placed under the care of Davy—at the time assistant to Beddoes. Before administering the gas, Davy thought of ascertaining the temperature of the body by the thermometer placed under the tongue. The paralytic, deeply impressed by Dr. Beddoes with the certainty of the success of the remedy, of which he knew nothing—soon after the thermometer was placed in his mouth, believing this to be the great curative agent—declared that he felt somewhat better. Nothing more was, therefore, done; and he was requested to return on the following day. The same form was then gone through, with the same results; and, at the end of a fortnight, the sick man was dismissed cured, no agent of any kind having been employed, except the thermometer.

Now, if the reasoning powers were not duly exerted, experience

¹ Propterea sola experientia absque doctrina et ratione incerta est, et conjecturalis. Qui enim novit rhubarbarum purgare bilem, nescit tamen quando, quibus, et cui morbo prosit, nisi sit medicus doctus et peritus. Primros. *De vulgi erroribus in medicina*, lib. i. cap. xl. Amstelod. 1639.

would obviously teach, as the result of this case, that the thermometer is an antiparalytic. The rational therapist is not, however, satisfied with this knowledge of the fact, for "fact it is." He enquires into the mode in which the effect was induced, and he is not long in referring it to the influence exerted by the *moral* over the *physique*; and he classes the thermometer with Perkinism, animal magnetism, and their congenerous arts,—amongst articles that act chiefly through the new impressions, which they make on the senses.

It might seem to those, who are unacquainted with medical history, that in periods approaching our own, no such illogical inferences could be deduced, and that it has been the custom with the profession, for ages, to bestow all due caution, and the most rational enquiry in the collection of facts. Such, however, is far from being the case. It is, indeed, humiliating to reflect on the credulity or faulty observation that has existed among nations, who have successfully cultivated many of the other branches of natural science. It ought scarcely to be credited, and yet it is nevertheless true, that the *aqua spermatis ranarum*, or "water of frog's spawn," was to be found not very long ago in the Pharmacopœia of Sardinia; and the *aqua hirundinum cum castoreo*, or "water of swallows with castor," in those of Manheim and Wirtemberg. The latter preparation is directed to be made as follows:—Take of *young swallows bruised in a mortar*, forty; rue, two handfuls; castor, one ounce; white wine, three pints. This disgusting preparation was given in hysteria and epilepsy. Again; the *bufones exsiccati*, or "dried toads," were in the Pharmacopœias of Spain and Wirtemberg,—having been formerly administered in powder, as a diuretic, in dropsy. In another work,¹ the author has adduced many examples as strange as those instanced, and it would be easy to enumerate still more.

In a recent French journal, and in an article by M. Ricord—the distinguished physician to the Venereal Hospital of Paris—we have an example of the pertinacity with which ancient prepossessions and inculcations adhere, and how difficult it is to think and to act according to the unbiased suggestions of our own observation and reflection. In the treatment of blennorrhagic epididymitis, or swelled testicle from gonorrhœa, M. Ricord recommends compression to be made by means of the "sparadrap," or plaster of vigo with mercury. This plaster, although prescribed by Ricord, is not

¹ General Therapeutics, p. 55. Philad. 1836.

value of remedies of more recent introduction, or of the older remedies whose use has been revived under novel applications, the present volume was undertaken by the author.

In Germany, several works exist on this subject, and that of Riecke—to which the author has repeatedly referred—served as a basis for many of the articles; his observations, however, do not come down further than the year 1836. Some of the statements—especially in relation to the observations of certain of the German physicians—are given on Riecke's authority, for he has rarely appended references, by which the correctness of his assertions could be tested.

It has been a great object with the author to furnish exact references to works in which further information may be obtained, and the number of these will show, that he has devoted no small amount of time and attention to the subject. He has likewise added the results of his own experience in public and in private. The motto which he has selected—*prodesse quam conspici*—conveys, in epitome, his feelings. His sole object has been, “to be useful”—and if he has succeeded, the reward is ample.

ROBLEY DUNGLISON.

Philadelphia, No. 9 Girard Street,
October 15, 1839.

Erratum—p. 402, line 11—for “*eighty*” read “*thirty*.”

NEW REMEDIES.

ACIDUM HYDROCYANICUM.

SYNONYMES. Acidum Prussicum, Acidum Borussicum, A. Zooticum, A. Zootinicum, Hydrocyanic, or Prussic Acid.

French. Acide Hydrocyanique, Acide Prussique.

German. Blausäure, Wasserstoffblausäure, Hydrocyansäure, Cyanwasserstoffsäure.

This acid can scarcely be looked upon as new : yet it is only in recent times that its application to pathological conditions has been well appreciated. It was discovered by Scheele, in 1780 ; but its preparation in a state of purity, and its exact chemical constitution, were not understood until Gay-Lussac published the results of his investigations on the subject in the year 1815.¹

METHOD OF PREPARING.

The three chief modes of preparing the hydrocyanic acid, at present received into the pharmacopœias, are those of Scheele, Gay-Lussac, and Vauquelin ; the *first* of which was adopted by the framers of the United States' Pharmacopœia of 1820, and by those of Belgium, Paris, and Ferrara ; the *second*, by the Pharmacopœias of Paris and Ferrara ; and the *third* by those of Belgium, Paris, and the United States.—(Edition of 1830.)

1. *Scheele's Method.*

Take of Prussian blue,	128 parts.
Red oxide of mercury,	64 parts.
Distilled water,	105 parts.

¹ Annales de Chimie, tom. lxvii. p. 128, and tom. xcv. p. 136.

Boil for a quarter of an hour, constantly shaking; strain, filter, and wash the residuum with

Boiling water, 128 parts.

Mix the two liquids together; introduce them into a flask, and add,

Porphyrised iron filings, 96 parts.

Sulphuric acid, (66°) 24 parts.

Diluted with

Distilled water, 24 parts.

Shake the mixture, and keep the flask for an hour in cold water; pour the decanted liquid into a tubulated retort placed in a sand bath, to the neck of which is attached an adapter that passes into a tubulated receiver, whence a curved tube issues that passes into a flask filled with water; lute the apparatus; cover the receiver with wet rags; raise the heat until the liquid boils, and until there have passed into the receiver—192 parts.

Add to this liquid, of

Carbonate of lime, 8 parts.

Distil again, and draw off 128 parts, which must be kept in a bottle covered with black paper.

This process of Scheele always affords an acid mixed with a variable quantity of water.

2. *Gay-Lussac's Method.*

Take cyanuret of mercury, at pleasure.

Introduce it into a tubulated retort, the neck of which is furnished with a wide tube of glass filled with broken marble and chloruret of calcium, which tube communicates, through a smaller one, with a bell glass surrounded by a freezing mixture.

Pour on muriatic acid sufficient to rise above the cyanuret to the height of a finger; heat gradually and moderately, and receive the condensed product into the bell glass.

The acid, obtained in this way, is anhydrous, and of the specific gravity .700.

3. *Vauquelin's Method.*

Take of

Cyanuret of mercury, 1 part.

Distilled water, 8 parts.

Pass a current of hydro-sulphuric acid gas into the solution, until the gas is in excess; pour into the liquid pulverised sub-carbonate of lead in sufficient quantity to remove the excess of

hydro-sulphuric acid : shake the mixture constantly, and when it has no longer the smell of putrid eggs, and ceases to blacken paper impregnated with acetate of lead, filter and preserve it carefully.

The product of this operation has been considered to approximate to the average density of the acid of Scheele.¹

The variable density of the acid prepared after Scheele's method, has prevented it from being generally used in medicine. The acid of Gay-Lussac is most commonly employed ; but as its degree of concentration renders it dangerous, it is diluted with distilled water. Robiquet has proposed to bring its density to .900, by adding two parts of water to it. Thus reduced, it resembles the acid of Scheele, with the advantage, that there is a constant and known ratio between the pure, or anhydrous acid, and the quantity of water united with it. Magendie adds to it six times its bulk, or eight and a half times its weight of distilled water, and calls the mixture *acide prussique medicinal*,² *medicinal prussic or hydrocyanic acid*. Others have advised the employment of a mixture of three parts of water, and one part of acid, under the name of *acide hydrocyanique au quart*, or "hydrocyanic acid of quarter strength."³

Dr. Bache asserts, that he has had the process of the United States' Pharmacopœia (Proust's or Vauquelin's) repeated, when he found the acid obtained to have the specific gravity .998.⁴

EFFECTS ON THE ECONOMY IN HEALTH.

Hydrocyanic acid is usually classed amongst the narcotic poisons,⁵ yet there is reason for believing, that its ordinary effects are purely sedative. Whilst the agents belonging to the class of narcotics produce, first of all, excitation in the organic actions, followed sooner or later, when the agent is in sufficient dose, by signs of sedation, this acid occasions the latter results only.

It is the most powerful of our poisons, producing, in an adequate

¹ See Notes on Hydrocyanic acid, by Dr. R. E. Griffith, in *Philad. Journ. of Pharmacy*, iv. 17. Philad. 1833; also, Pereira, *Elements of Materia Medica*, part i. p. 236. Lond. 1839.

² *Formulaire pour la préparation etc. de plusieurs nouveaux médicamens.*

³ *Pharmacopée Universelle*, par Jourdan, i. 31. Paris, 1828.

⁴ *The Dispensatory of the United States of America*, by Drs. Wood and Bache, 3d edit. p. 713. Philad. 1836.

⁵ *Christison's Treatise on Poisons*, 3d edit. Edinb. 1836.

dose, the fatal result so suddenly, that the animal experimented upon can scarcely be removed from the lap of the experimenter before all signs of life are extinct. This rapidity of action negatives the idea, that the acid acts through the mass of blood, and favours the view of those who believe, that the impression is made immediately on the nerves of the part with which it is placed in contact, or on the nerves that are distributed to the lining membrane of the blood vessels, as suggested by Messrs. Addison and Morgan.¹ It seems to us, however, that the same objection applies to the explanation of these gentlemen as to that which ascribes the effects to the poison being taken into the blood—that the fatal result is often too sudden for us to presume that it has entered the blood vessels; unless we esteem it an agent possessed of powerfully penetrating properties. In very large doses, the sensibility of the whole nervous system becomes annihilated almost with the rapidity of lightning.

A female, who was deceived by the odour of a solution of hydrocyanic acid in alcohol, drank a small vialful and died in two minutes, as if struck with apoplexy. A strong healthy man, thirty-six years of age, being detected in thieving, swallowed a small vialful of the acid, staggered a few steps, and fell dead. Four or five minutes afterwards, the physician who was called, found him lifeless, without the slightest trace of pulse or respiration. In a few minutes, convulsive expirations were observed, but no indications of returning life: the face was sunken and livid; the hands and feet deadly cold; the forehead and face cold and dry; and the eyes half open, and glassy.²

Dr. Damason³ relates the case of a druggist, who had some hydrocyanic acid in a vial with a ground stopper, and as it had been prepared almost three months, thinking that it was decomposed, he opened the vial, and applied it to his nose to ascertain whether the acid retained any smell: he instantly fell down, and remained for half an hour without giving the slightest signs of life; but finally recovered after an illness of several days.

Many experiments have been made on animals with this acid.

A drop, introduced into the bill or anus of a sparrow, induced

¹ An Essay on the operation of poisonous agents upon the living body. Lond. 1829.

² Hufeland, *Journal der practisch. Heilkund.* Band. xl. St. 1, S. 85 to 92, and Osann, in *Art. Blausäure*, in *Encyc. Wörterb. der Medicinischen Wissenschaft.* Band. v. S. 528. Berlin, 1830.

³ *Journal de Chimie Médicale.* Juin, 1831.

death in from one to two minutes, preceded by convulsions. Even holding the bill over a vial filled with the acid proved fatal.

A duck was destroyed by fourteen drops.

Twenty drops, introduced into the stomach of a rabbit, killed it in three minutes. When a few drops were injected into the jugular vein, death supervened still sooner.

A small dog, to which two drops had been given, experienced shortness of breath; staggered, fell, passed its urine repeatedly; vomited twice, and afterwards seemed quite well.

The same animal took, five hours later, eight drops, and fell into a tetanic, comatose condition, but recovered in half an hour. More severe but not fatal effects resulted from sixteen drops. Thirty to forty drops, administered to dogs and cats, produced violent convulsions and death, in from six to fifteen minutes.

The experiments of Emmert and Coullon seem to have shown that the action of hydrocyanic acid is more violent when it is injected into the jugular vein, or inhaled in a concentrated form; less so when injected into the rectum. In the case of a horse, into whose jugular it was injected, death occurred in twenty-one minutes. When placed in contact with the dura mater, or with nerves, no striking phenomena were perceptible. [?] This fact was confirmed by Viborg.¹ On the other hand, when received into a wound in its concentrated state, it acts most violently. Scharring, who broke a glass containing the acid, and received some of it into the wound produced thereby, died in an hour after the accident.

It is not easy to deduce comparative results from the statements of different experimenters, inasmuch as we are ignorant of the precise strength of the acid employed. A French physician made some experiments on the uncertainty of the strength of the medicinal acid; and he found, that he could swallow a whole ounce of one sample, and a drachm of a stronger sample, without sustaining any injury; but on trying some, which had been recently prepared by Vauquelin, he was immediately taken ill, and narrowly escaped with his life.² Mr. Pereira³ once caused the instantaneous death of a rabbit by applying its nose to a receiver filled with the vapour of the pure acid: the animal died without a struggle. A drop of the pure acid of Gay-Lussac, placed in the throat of the most

¹ Osann, loc. cit. S. 580.

² Revue Médicale, xvii. 265, and Christison on Poisons, 3d edit. p. 690. Edinb. 1836.

³ Op. citat. p. 242.

vigorous dog, caused it to fall dead after two or three hurried respirations.¹

We have already alluded to the effect of the acid when dropped upon the conjunctiva—a mucous surface, and therefore possessed of highly absorbing powers: but it cannot be placed with impunity in contact with surfaces, which, owing to their being covered with cuticle, do not readily absorb. Orfila² states, that a professor of Vienna, having prepared a pure and concentrated acid, spread a certain quantity of it on his naked arm, and died a short time afterwards. Dr. Christison,³ however, says this was probably a mistake. On repeating some of the experiments, he⁴ found, that a single drop, weighing scarcely a third of a grain, dropped into the mouth of a rabbit, killed it in eighty-three seconds, and began to act in sixty-three seconds; that three drops, weighing four-fifths of a grain, in like manner killed a strong cat in thirty seconds, and began to act in ten; that another was affected by the same dose in five, and died in forty seconds; that four drops, weighing a grain and a fifth, did not affect a rabbit for twenty seconds, but killed it in ten seconds more; and that twenty-five grains, corresponding with an ounce and a half of medicinal acid, began to act on a rabbit, as soon as it was poured into its mouth, and killed it outright in ten seconds at farthest. Three drops, projected into the eye, acted on a cat in twenty seconds, and killed it in twenty more; and the same quantity, dropped on a fresh wound in the loins, acted in forty-five, and proved fatal in one hundred and five, seconds.

When given in rather too strong a dose, or—if in proper doses—at too short intervals, it produces headach, and vertigo, which go off, however, in a few minutes: when inhaled, even if diluted with atmospheric air, it causes vomiting, prostration, pains in the back part of the head, and great diminution of the arterial pulsations. In a more concentrated state, the effects are more rapidly fatal than in any other form of administration. M. Robert found that when a bird, a rabbit, a cat, and two dogs, were made to breathe air saturated with its vapour, the first and second died in one second;

¹ Magendie, in *Annales de Chimie et de Physique*, vi. 347, and *Formulary*.

² *Toxicologie*.

³ *Op. cit.* p. 707.

⁴ *Op. cit.* p. 694. See also, Dr. Geoghegan, in *Dublin Medical Journal*, for 1835, and Pereira, *Op. cit.* p. 242.

the cat in two seconds; one dog in five, and the other in ten seconds.¹

With regard to the parts of the economy that are primarily acted upon by the hydrocyanic acid, there can be but little doubt in designating the nervous system. In no other way can we readily explain the extreme rapidity of its action in fatal cases. When once mixed with the blood, however, out of the body, it altogether changes the character of that fluid, and opposes its coagulation.² Some of the German writers³ have endeavoured to indicate three grades of its action on the economy. *First*. In moderate doses, long continued, it occasions a marked diminution in the action of the nervous and vascular systems; vertigo; disposition to syncope: epistaxis as a consequence of thinness of the blood, and a disposition to putrid diseases.⁴ *Secondly*. In larger doses, the sedative effect of the acid on the spinal marrow, and the abdominal ganglia, is indicated by feelings of weakness, numbness, tremors, and other involuntary motions of the extremities, involuntary discharge of the urine and fæces, augmentation of the cutaneous and urinary depurations; palpitations, anxiety at the præcordia, weak pulse, and, according to some, headach, especially in the back part of the head; excoriation of the tongue and inner parts of the cheeks,⁵ and salivation. This last symptom is given by Dr. Christison⁶ on the authority of Drs. Macleod and Granville.⁷ It has been suspected, however, that salivation, in these cases, was brought about by the use of an impure acid, containing probably a small quantity of the deuto-chloride of mercury, particularly if the acid had been prepared—according to the process of the Dublin College—with bicyanide of mercury, muriatic acid and water. Mercury is, indeed, asserted to have been actually discovered in the acid by Sylvester's test. *Thirdly*. In still larger doses, violent affections of the spinal marrow, convulsions, trismus, opisthotonos, emprosthotonos, fainting, &c. are induced.

¹ Annales de Chimie, xcii. 59.

² Magendie, Lectures on the Blood. Lect. xvii. in Lancet, for Jan. 26, 1839, p. 636. On its Action when injected into the Vessels; see Mr. Blake, in Edin. Med. and Surg. Journ. April, 1839, p. 339.

³ Richter, Specielle Therapie, Band. x, S. 280. Berlin, 1828; and Osann, loc. cit. S. 527.

⁴ Encyc. Wörterb. B. ii. S. 315.

⁵ Born, in Rusts Magazin, B. xiii. S. 282.

⁶ Op. citat. p. 701.

⁷ Lond. Med. and Phys. Journ. xlvi. 359 and 363.

From the results of all his observations, Osann¹ infers, that the hydrocyanic acid acts dynamically on the nervous system, by diminishing, depressing, and annihilating its life, and, through the nervous system, affecting the organs of vegetation or nutrition, and of hæmatisis;—that it incontestably has a specific relation to the spinal marrow, the ganglions of the abdomen, and the dependent organs; and hence it is, that, in comparison with other narcotic agents, it is less stupifying, whilst it influences more deeply the phenomena of vegetative or organic life. He properly remarks, however, that the inferences of Jörg,² from his experiments, are apparently opposed to this view. Jörg considered its effects upon the brain to be excitant, and that it occasioned turgescence of that organ.

EFFECTS ON THE ECONOMY IN DISEASE.

From the effects produced by the hydrocyanic acid on the healthy body, we may infer the cases of disease in which it may be indicated. It is decidedly sedative, allaying nervous irritability and vascular action, and therefore adapted for all cases in which these are inordinately excited. Yet its power, as a medicinal agent, is not as great as was at one time presumed, and as is still presumed by many. In some countries, too, it has found more favour than in others. In Italy, France and England, it has been more extensively used than in Germany; yet in many of the Pharmacopœias of the last country it has been admitted into the list of officinal agents. The great objections that have been urged against it are—its danger, even in a small dose, if not carefully administered; the difficulty of having it always of the same strength; the impossibility of administering it undiluted, and the danger of giving too strong a dose in consequence of its rising to the surface of water. More than once the difference in the strength of the acid, prepared by different methods, would seem to have given rise to unfortunate results. Orfila³ mentions the case of a sick person, who had used for a length of time the hydrocyanic acid, in increasing doses, with advantage; when, being compelled to send her prescription to another apothecary, the acid he employed was so strong as to produce death, with all the symptoms of poisoning by hydrocyanic

¹ Loc. citat. S. 526.

² Materialien zu einer künftigen Heilmittellehre. B. i. S. 53, 117.

³ Toxicologie.

acid. For these and other reasons, Riecke, L. W. Sachs, and Osann greatly prefer the Aqua laurocerasi and the Aqua amygdalarum amarum, which, although in other respects not less objectionable, are far less dangerous.¹

Possessed of the powerful sedative agency, which has been described, it is not to be wondered at, that the hydrocyanic acid should have been prescribed in a multitude of cases, and, as constantly happens, that unsuccessful trials, suggested by the merest empiricism, should have been made with it.

In inflammations, especially when accompanied with marked erethism of the nervous system, it has been greatly extolled, and, next to blood-letting, has been regarded by many as one of our most valuable antiphlogistics. The followers of the contro-stimulant school esteem it as one of their most efficacious contro-stimulants.

In the acute inflammations of internal organs it has been highly recommended by the Italian physicians, Borda and Brera, in thoracic inflammation, after blood-letting, in conjunction with tartarised antimony and similar sedative agents; and by others in enteritis, metritis and nephritis, and in active hemorrhages.

In chronic inflammations it has been advised by Granville, Magendie, Heller, Elwert, Behr, Roch, &c., especially in chronic catarrh, bronchitis, and hooping cough. In the last affection it is conceived by Dr. Roe² to possess a "specific" (?) power. In warm weather he thinks it will cure almost any case of simple hooping cough in a short time; that in all seasons it will abridge its duration, and in almost every instance, where it does not cure, that it will, at least, materially relieve the severity of the cough.

In pulmonary consumption it has been recommended by Granville, Magendie, S. G. Morton, Fantonetti,³ and others, particularly where there is any inflammatory or spasmodic complication; but others, as Neumann, Weitsch, Sir James Clarke, and, we may add, ourselves, have given it in these very cases without any success. By some, indeed, it has been affirmed, that its administration in phthisis is to be adopted with caution, as in many cases instead of

¹ Die neuern Arzneimittel, ihre physischen und chemischen Eigenschaften, Bereitungsweise, Wirkung auf den gesunden und kranken Organismus, u. s. w. von V. A. Riecke, S. 5. Stuttgart, 1837; Osann loc. citat. and Encyclop. Wört. ii. 315.

² A Treatise on the Nature and Treatment of Hooping Cough, &c., p. 10, London, 1838.

³ Gazette des Hopitaux, Fev. 19, 1839.

allaying, it appears to have increased, the cough and fever, diminished the expectoration, and occasioned a sense of suffocation :¹ it has been, moreover, asserted, that its depressing and destructive agency has acted injuriously on the organism of the consumptive.²

In chronic nervous diseases, especially when of a spasmodic character—as in spasmodic affections of the heart—even when organic, the hydrocyanic acid has been advised as a soothing agent, as well as in spasmodic asthma ; in the sense of suffocation that accompanies hydrothorax and other affections ; and in spasmodic dysphagia.

Its efficacy, too, has been marked, according to Elliotson,³ in various neuropathic disorders of the stomach, especially in those in which pain at the epigastrium was the leading symptom,—in every form, indeed, of gastrodynia ; and in painful affections of the bowels, of a similar character, it has been found useful by Mr. Pereira.⁴

In enlargement of the heart it was found by Heller to diminish the force and frequency of the pulsations, and in this way to afford essential relief. In an old person, labouring under anasarca, accompanied by great pain in the breast, Rees observed, after the administration of Vauquelin's acid, great diuresis, with the removal of the dropsy and its concomitant symptoms.⁵

In the asthma pulverulentum of the Germans, (*Starb asthma*), that is, in the variety to which millers, bakers, grinders and others are liable, Creutzwicher is said to have found it highly serviceable.⁶

Its efficacy has not been so marked in epilepsy, chorea and kindred affections ; yet it has been strongly recommended in tetanus. Trevezant ordered it in a case of traumatic tetanus, after opium had been given in vain, in the dose of from two to twelve drops with favourable results.⁷ On the other hand, Klein gave it in a similar case, with no other apparent effect than that of rendering death

¹ Schneider, Med. Prakt. Adversarien am Krankenbette, Erste Liefer, S. 62, referred to by Osann.

² Siebergundi, in Hufeland's Journal der pract. Heilkund. B. liii., St. 6. S. 15.

³ On the efficacy of Hydrocyanic or Prussic Acid in Affections of the Stomach, &c. Lond. 1820.

⁴ Op. citat., p. 247.

⁵ Osann, Op. cit. and Harless Rhein-Westphäl. Jahrbuch. Bd. x, St. 1, S. 82.

⁶ Rust's Magazin, Bd. xxii, S. 335.

⁷ Froriep's Notizen, Bd. xiv, No. 15, S. 324.

more easy.¹ It has likewise been advised in spasmodic pains of the uterus.

Yet, although it would seem to be soothing and antispasmodic in many cases of erethism, Grindel and Osann² consider it by no means adapted for the radical cure of spasmodic diseases.

In violent neuralgia, especially in an impressible condition of the vascular system, in nervous cephalalgia, hemicrania, tic-douloureux, and in gouty and rheumatic sciatica it has been extolled. Dr. E. S. Bonnet,³ of Charleston, treated successfully some cases of facial neuralgia, of great severity, by this agent applied externally in the form of the distilled water of the *prunus laurocerasus*. It is proper, however, to remark, that in two of the three cases described, belladonna was employed in combination. The mode of applying it was by lotion, composed of ζ iv. of the laurel water, one ounce of sulphuric ether, alone, or with half a dram or a dram of extract of belladonna. With this lotion the affected parts, previously covered with carded cotton or cotton wadding, were kept constantly wet.

It has likewise been recommended by Elliotson⁴ in the cure of vomiting, not dependent upon inflammation.

These are the chief cases in which its internal use has been prescribed.

It has been employed externally in the following cases.

As a soothing agent in severe pain;—for example, in toothach from caries; one to two drops, according to Elwert, being put into the hollow tooth. Krimer applied it in a dilute state to painful wounds, and it has been injected with advantage into fistulæ.

In neuralgia the application of a cataplasm of belladonna and hydrocyanic acid has been advised by some.

In cutaneous affections, of an itching, painful or inflammatory nature, it has been used with much success.

In five cases of obstinate herpes, Schneider used a solution of the acid in rectified spirit of wine; in similar cases Dr. A. T. Thomson, besides the use of a purgative of calomel and colocynth, applied compresses to the parts wetted with the dilute acid. In two cases of impetigo, the local application completely allayed the distressing and intolerable itching and tingling, after other external applications, and the internal use of anodynes had been of

¹ Heidelberger Klinische Annalen, Bd. ii, S. 112.

² Loc. citat., S. 535.

³ North American Archives, for April, 1835.

⁴ Lond. Med. Gazette, 1831, and Amer. Journ. of Med. Sciences, May, 1831, p. 242.

no avail; the discharge was diminished and rendered milder by it. Alterative doses of mercury, combined with sarsaparilla, formed the internal treatment.¹ Dr. Thomson found the lotion useful, in combination with small doses of oxymuriate of mercury, in acne rosacea, and in several other cutaneous affections.

In cases of herpes, Magendie advises a lotion of hydrocyanic acid and aqua lactucæ in the proportions mentioned hereafter.

The acid has likewise been used, in the form of glyster, in scirrhus of the pylorus, in the strength of six drops of Vauquelin's acid to eight ounces of water;² and in uterine pain from scirrhus, injections of the acid, combined with infusion of belladonna, have been employed beneficially.

In ophthalmia, especially of the scrofulous kind, with engorgement of the conjunctiva, it has been advised by Elwert³—two drops of the acid being mixed with a dram of water, and a little dropped frequently into the eye; and it has been given in the active inflammatory stage of blennorrhœa.⁴

Lastly, when a portion of tænia has protruded from the rectum,—with the view of destroying it, it has been advised by Cagnola, Gelnecke, and others, to apply the hydrocyanic acid to it.⁵

Such are the principal affections in which the hydrocyanic acid has been used. We have often employed it internally in many of the cases recommended, especially in painful affections accompanied by great nervous impressibility, and in consumption, but have not had sufficient reason to place it high in rank amongst our medicinal agents. We have certainly had no evidence, that it can cure consumption when not beyond its first stage, as remarked by Magendie.⁶ If the practitioner will bear in mind the effects, which the acid is capable of inducing upon healthy man, when the dose is carried to the requisite extent, he will have no difficulty in deciding upon the cases in which its agency may be appropriate. If not a true sedative, it is the nearest approach to one, and therefore

¹ London Medical and Physical Journal, Feb. 1822; and the author's edit. of Magendie's Formulary, p. 112. Lond. 1824. Philad. 1825.

² Bernd, in Rust's Magazin. Bd. xiii, S. 273.

³ Ibid. B. xiii, S. 182.

⁴ Ibid. B. xxii, S. 228.

⁵ Osann, Op. cit., and Gerson und Julius, Magaz. d. Ausländischen Litteratur der gesamt. Heilkund. B. ii, 177. Also, Hufeland und Osann's Journal der prakt. Heilkund. Bd. lviii, St. 6, S. 122. See also Richter, Op. cit. S. 313.

⁶ The author's edit. of the Formulary, p. 108.

its employment is clearly indicated in all diseases in which there is much erethism,—administered alone or along with other agents of the same class.

MODE OF ADMINISTRATION.

After the remarks that have been made on the varying strength of the hydrocyanic acid, according to the particular form by which it may have been prepared, it is hardly necessary to say, that the physician must be acquainted with the character of the acid he prescribes. It has been remarked, that the acid, directed in the Pharmacopœia of the United States, is prepared after Vauquelin's form. The ordinary dose of this acid is a drop, given three times a day in a little sugared water: it must be borne in mind, however, that the specific gravity of the acid is less than that of water, and hence the necessity of dropping the quantity of acid at the time of using it, rather than forming a mixture with a larger quantity of the acid, which will certainly rise to the surface, if the mixture be put to one side: and unless the vial is shaken, a much larger dose may be administered than was intended.

It must also be recollected, that the acid loses its strength by keeping. Magendie remarks,¹ that when left to itself in a close vessel, it sometimes becomes decomposed in less than an hour, and that it rarely preserves its integrity for more than a fortnight.

The substances, that are incompatible with it in the same prescription, are most metallic oxides, particularly those of mercury and antimony, nitrate of silver, salts of iron, sulphurets, mineral acids and chlorine.

The proper plan is to begin with a small dose and to augment it carefully until some effect is induced, but if any of the signs—mentioned above as indicating the supervention of the sedative effects of the acid—should supervene, it ought to be discontinued.

Magendie, we have seen, uses the hydrocyanic acid of Gay-Lussac, diluted with 8.5 times its weight of water; and this mixture he denominates *medicinal prussic acid*.

¹ Op. citat. p. 104.

The following are forms in which the acid may be administered.

Mistura Acidi Hydrocyanici.

(*Mélange pectoral.*)

Mixture of hydrocyanic acid.

- ℞. Acidi hydrocyanici medicinalis, ʒj.
Aquæ distillatæ, ℥j.
Sacchari albi, ʒ iss. M.

A dessert spoonful of this is directed to be taken every morning and evening at bed time—the dose being gradually increased to six or eight spoonfuls in the 24 hours. MAGENDIE.

- ℞. Acidi hydrocyanici (Scheele's), ℥. xij.
Liquor. antimon. tartarizat. ʒj.
Tinct. opii camphoratæ, ʒiiss.
Misturæ camphoræ, ʒ vijss. Fiat mistura.

Dose—In hooping cough; a table spoonful every four hours for a delicate boy four years old, to be given in some warm drink. The child to remain in a warm room, and to live upon light pudding and broth. ROE.

- ℞. Acidi hydrocyanici (Scheele's), ℥. xx.
Liquor. antimon. tartarizat. ʒiiss.
Vini ipecacuanhæ, ʒiiss.
Aquæ, ʒxiij. Fiat mistura.

Dose—A small spoonful every two hours for a healthy looking female child, five years of age. ROE.

Syrupus Acidi Hydrocyanici.

Syrup of hydrocyanic acid.

- ℞. Syrupi purificat. ℥j.
Acidi hydrocyanici medicinalis, ʒj. M.

This syrup may be added to common pectoral mixtures, and used as other syrups are. MAGENDIE.

Lotio Acidi Hydrocyanici.

Lotion of hydrocyanic acid.

- ℞. Acidi hydrocyanici, f. ʒiv.
Spiritus vini rectific. f. ʒj.
Aquæ distillat. f. ʒ xss. M.

This was the lotion employed by Professor Thomson in the cases of impetigo.

The following was used by Schneider, in herpes.

℞. Acidi hydrocyanici, ℥iss.
Spirit. vini rectific. ℥vi. M.

And in the same cases, Magendie employed the subjoined formula.

℞. Acidi hydrocyanici, ℥ij.
Aquæ lactucæ, ℥ij. M.

The distilled water of the garden lettuce probably contains nothing to recommend it over common distilled water.

All these formulæ are objectionable for the reasons before assigned, and it is consequently better to drop the acid at the time of using it, taking care that it has not lost its properties.

ACIDUM LACTIS.

SYNONYMES. Acidum Lacticum, Lactic Acid, Acid of Milk.

French Acide Lactique.

German. Milchsäure.

This acid is recommended as a therapeutical agent by Magendie in the last edition of his *Formulaire*.¹

METHOD OF PREPARING.

Lactic acid may be obtained either from milk or from the juice of the red beet. In the latter case, the juice is put in a situation the temperature of which is between 77° and 86° Fah. After the lapse of a few days, a commotion is observed in the mass, which is known under the name "viscous fermentation," (*fermentation visqueuse*), and hydrogen and carburetted hydrogen are evolved in

¹ *Formulaire pour la préparation et l'emploi de plusieurs nouveaux médicaments, &c.* Edit. 9ème. Paris, 1836.

considerable quantity. When the mass has become fluid again, and the fermentation has ended, which generally requires about two months, it is evaporated to the consistence of syrup; the whole then becomes traversed by a multitude of mannitic crystals, which when washed with a small quantity of water and dried, are entirely pure.

The mass, moreover, contains a saccharine matter, which affords all the signs of the sugar of the grape.

The product of the evaporation is next treated with alcohol; this dissolves the lactic acid, and precipitates several substances, which have not yet been examined. The alcoholic extract is then dissolved in water, which occasions a fresh precipitation. The liquid is now saturated with carbonate of zinc, and by this means a fresh precipitation is effected, more copious than the preceding. By concentration, the lactate of zinc shoots into crystals; which are collected and heated in water, to which animal charcoal, previously washed in muriatic acid, has been added: the fluid is then filtered, and the lactate of zinc is deposited in perfectly white crystals: these are washed in boiling alcohol, in which they are insoluble; afterwards they are treated with baryta, and then with sulphuric acid, which separates the lactic acid, which is finally concentrated *in vacuo*.¹

Mitscherlich² gives the following process for preparing it pure. Lactate of lead, formed in the usual way, is decomposed by sulphate of zinc, the sulphate of lead is separated, and the lactate of zinc crystallised by evaporation; this is at first yellow, but by repeated crystallisations, it is obtained of a pure white. The solution of this lactate is decomposed by pure baryta; the oxide of zinc separated, and the lactate of baryta, which is in solution, is decomposed by sulphuric acid, and the fluid evaporated; this yields a clear, colourless, syrupy, not volatile acid, which is decomposed and leaves a residue of charcoal, when heated at a sufficiently high temperature.

Milk, which has been suffered to ferment for a long while, and is treated in the same way, affords lactic acid. Corriol has likewise detected it in an aqueous infusion of the *nux vomica*.

When concentrated *in vacuo*, until it parts with no more water, lactic acid is a colourless liquid, of syrupy consistence; its specific

¹ Gay Lussac & Pélouze, *Annales de Chimie et de Physique*, Avril, 1833. (Tom. lii. 410.)

² Report to British Association, 2d meeting, and *Philad. Journ. of Pharmacy*, vi. 83. *Philad.* 1834-5.

gravity being about 1.215. It is inodorous, but of a very sour taste, similar to that of the strongest vegetable acids. When exposed to the air, it attracts moisture. Water and alcohol dissolve it in all proportions. One of its most striking properties, which is of especial interest to the physician, is, that it quickly dissolves phosphate of lime, especially that which is contained in bones.

EFFECTS ON THE ECONOMY.

As lactic acid seems to play a part amongst the juices which effect the solution of the food in the stomach, Magendie thinks it may be given with advantage in cases of dyspepsia produced by simple debility of the digestive apparatus; and his experiments afforded him very encouraging results. In consequence too of the facility with which it dissolves the phosphate of lime, it has been suggested, whether it might not be administered with advantage in cases of white gravel, or, in other words, in phosphatic depositions from the urine. Magendie has not yet been able to institute experiments on this matter. At the time when the edition of his Formulary, to which we have referred, was published, he had commenced some clinical experiments with the lactate of potassa and the lactate of soda, but without any results worthy of being communicated to the profession. He recommends these salts, however, to the attention of physicians.

MODE OF ADMINISTRATION.

Magendie gives the lactic acid either in the form of lemonade or of lozenges.

Potus Acidi Lactis.

Lemonade of lactic acid.

- ℞. Acid. lact. liquid. ℥j. ad ℥iv.
 Aquæ, ℥ij.
 Syrupi, ℥ij. M.

Pastilli Acidi Lactis.

Lozenges of lactic acid.

- ℞. Acid. lact. pur. ℥ij.
 Sacch. pulv. ℥j.
 Gum. tragac. q. s.
 Ol. æther. vanigl. gtt. iv. M.

Make into lozenges, weighing half a dram each.

Let the lozenges be kept in a well closed vessel. Of these, from two to six may be taken in the 24 hours without any evil consequences.

ACIDUM PYROLIGNOSUM.

SYNONYMES. Acidum Pyro-aceticum, Acidum Ligni pyro-oleosum, Acidum aceticum empyreumaticum, Acetum ligneum, Pyroligneous and Pyrolignic acid.

French. Acide pyro-acetique, A. pyrolignique, A. pyroligneux, Vinaigre de bois.

German. Brenzliche oder brandige Holssäure; Holzsäure; Holzessig.

The pyroligneous acid, although brought much into notice—revived as it were—in recent times, is by no means the product of those times exclusively. The cedria, with which the Egyptians embalmed the bodies of the dead, it is presumed, was identical with it. Pliny recommends cedria, or the oil of tar, got from the cedar, in toothach,¹ and Galen unites with him.² The virtues of the pyroligneous acid are often also referred to by Boerhaave.³

METHOD OF PREPARING.

The pyroligneous acid is prepared in chemical laboratories by the dry distillation of wood, especially of hard wood, which is placed in an iron retort heated to redness. First of all, there passes over a light brown or greenish fluid, which contains some empyreumatic oil; to this succeeds the pyroligneous acid, which is formed during distillation. If the distillation be continued, more empyreumatic oil passes over, and lastly tar.

The chief constituent of the pyroligneous acid is vinegar, which can be deprived of its empyreumatic constituents by rectification with fine porous animal charcoal. Besides the vinegar, it contains

¹ Hist. Nat. xxxiv. 11.

² De Simpl. Medic. Facult. lib. vii. See Cormack on Creosote, p. 59. Edinb. 1836; or the American edit. in Dunglison's American Medical Library.

³ Riecke, Die neuern Arzneimittel. u. s. w. S. 6. Stuttgart, 1837.

empyreumatic oil, (*pyrelain*;) empyreumatic resin, (*pyrretin*,) a peculiar matter containing azote, and similar to an extract, (an empyreumatic extract,) and spirit of tar, (*spiritus pyrolignicus*.) Of late years, Reichenbach has discovered in it a new substance, creosote;¹ which seems to be the most important ingredient, its medicinal efficacy appearing to be dependent upon that substance.

Impure pyroligneous acid is of a brownish colour, and of an acid smoky smell and taste. This is the preparation which is generally used externally; but, by chemical means, the acid may be purified so as to furnish the *acidum pyrolignosum rectificatum*. This differs from the impure pyroligneous acid in containing less empyreumatic resin and extract, and creosote. The London College again prepare from it a stronger acid, the *acidum aceticum fortius*, which is extremely volatile and pungent, and is used as a revellent.

EFFECTS ON THE ECONOMY IN HEALTH.

From experiments instituted on animals, it would appear, that the administration of the pyroligneous acid in large doses, occasions vomiting of a considerable quantity of a frothy fluid smelling strongly of the acid; tremors of the limbs, convulsions, tetanus, protrusion of the eyes, insensibility, paralysis of the limbs, dyspnœa, croupy cough, hoarseness, &c. The death of the animal supervenes with symptoms of suffocation, and the fatal termination is often rapidly induced. Inspection after death exhibits manifest venous congestion in the brain, spinal marrow, lungs, liver, and spleen, and in the right side of the heart, with, at times, inflammation of the stomach. According to Berres, it occasions markedly narcotic effects. In by no means considerable doses, he found it to cause violent pain in the stomach and bowels, nausea and vomiting, general weakness, heaviness, vertigo, convulsions, and even death, without exhibiting any marked effect upon the vascular system. In smaller doses, it is said to produce a sensation of burning in the stomach, and after a time to quicken the pulse, and augment the cutaneous and renal depurations. Others—and the best observers, we think—deny it any narcotic properties.²

As an antiseptic, its efficacy is undoubted, and this has been long known. The creosote is, doubtless, the main agent in producing

¹ See the article Creosote.

² Richter's *Specielle Therapie*. S. 255, Berlin, 1828.

this result, and wherever the administration of creosote is indicated, the use of the pyroligneous acid may be proper.

EFFECTS ON THE ECONOMY IN DISEASE.

Possessed of the properties described above, the pyroligneous acid was at once suggested in cases of gangrene and sphacelus, in which it was successfully used, as well as in cachectic conditions brought on by the misuse of mercury, and in herpetic, flabby, fungous and sloughing ulcers; in porrigo, and in toothach produced by caries, the acid being dropped upon cotton and applied to the hollow tooth. In most of these cases, it was generally exhibited both internally and externally. Numerous experiments have been made with it in various affections by different observers; but its use has been more especially extolled in cases of gangrene, in which it corrects fœtor, and promotes the separation of the dead parts.¹ The physicians of the Berlin Charité experimented with it in cases of sloughing gangrenous sores with such success, that they pronounced it an antiseptic of the highest order.² Besides the cases mentioned, it has been advised in excoriated nipples, mixed with white of egg,³ in cancerous and scrophulous affections, in cancrum oris, in caries of the bones, and as a gargle in scarlet fever. It has, moreover, been recommended by Buchanan⁴ in deafness caused by deficient secretion of the cerumen of the ear, and in discharges of an offensive character from the meatus auditorius, as well as from other outlets; in chronic inflammation of the tarsal edges of the eyelids, and in scabies. In gastromalacia it has been recommended by Pitschaft⁵ and Teufel;⁶ in phthisis by Harless, and in dropsy, diarrhœa, putrid nervous fevers, &c. by Ampach;⁷ yet, as was before remarked, it is rarely employed internally; indeed, both externally and internally, it has been greatly supplanted by creosote.

¹ Dr. T. Y. Simons, in *American Journal of the Medical Sciences*, vol. v.

² V. A. Riecke, *Op. cit.* S. 9.

³ Dr. Bursharat, in *Gazette Médicale*, and *Amer. Journ. of the Medical Sciences*, Feb. 1833, p. 503.

⁴ *Illustrations of Acoustic Surgery*, Lond. 1825.

⁵ *Med. Chirurg. Zeitung*, No. 7, 1825.

⁶ *Annal. für die gesammte Heilkund. unter der Redact. d. Mitglied. der Badensch. Sanitätsk.* 2ter Jahrg. 1825.

⁷ *Rust's Magazin*, B. xvi, H. 2. S. 353, and *Richter, Op. cit.* B. x. S. 257, Berlin, 1828.

MODE OF ADMINISTRATION.

The inequality in the strength of the preparation renders it difficult to fix upon any precise dose. Of the impure pyroligneous acid, Sachs administered from five to thirty drops three or four times a day, in simple or aromatic water.

Externally, it is applied both in a pure and dilute state; in the former case to ulcers, by means of a pencil, several times in the day. It is generally diluted with simple water; but in cases of cancrum oris, sugared water has commonly formed the diluent. It is also applied at times in the way of cataplasm. As a wash in porrigo, and as an injection, it may be diluted with six or eight parts of water; as a collyrium, the proportion may be one part of the acid to twelve of water, and it may be employed, of about the same strength, as a gargle.

Heim has recommended the following application in cancrum oris.

Mel acidi pyrolignosi.

Honey of pyroligneous acid.

- ℞. Acid. pyrolignosi crud. ℥iiss.
Mellis rosati, ℥j. M.

To be applied by means of a pencil.

Buchanan advises the following form of injection in cases of purulent discharges from the meatus auditorius.

Injectio acidi pyrolignosi.

Injection of pyroligneous acid.

- ℞. Acid. pyrolignos. ℥ij.
Aquæ distillatæ, ℥vj. M.

Fiat injectio bis die utenda.

The following drops he recommends in cases where the cerumen is deficient in quantity.

Guttæ acidi pyrolignosi.

Drops of pyroligneous acid.

- ℞. Acidi pyrolignos. crud.
Olei. terebinth. rectific.
Sp. ætheris sulphur. comp. aa. partes æquales. M.

Two drops of this compound are to be dropped every night into the meatus auditorius.

Cataplasma acidi pyrolignosi.

Cataplasma of pyroligneous acid.

℞. Furfur. ℥ss.

Pulv. sem. lin. ℥j. M. bene et adde

Acid. pyrolignosi crud. q. s. ut fiat cataplasma.

To be applied in cases of foul ulcers.

Linimentum acidi pyrolignosi.

Liniment of pyroligneous acid.

℞. Acid. pyrolignos. ℥ss.

Balsam. peruv. ℥ij.

Vitell. ovi, q. s. ut fiat linimentum.

To be applied on lint three times a day to sloughs in ulcers.

Collutorium acidi pyrolignosi.

Mouth-wash of pyroligneous acid.

℞. Acid. pyrolignos. rectific. ℥ss.

Aquæ cinnamomi simpl. ℥iv.

Syrup. moror. ℥ij. M.

Dr. Phöbus advises this as a wash for the mouth in cases of cancerum oris. It should be kept in a glass vessel covered with black paper to prevent decomposition.

ACONITINUM.

SYNONYMES. Aconitia, Aconita, Aconitine.
German. Akonitin.

This active principle, which was discovered by Peschier,¹ and by Brandes, has been recommended of late by Turnbull,² whose eulogies on the medical virtues of the natural order Ranunculaceæ are evidently overstrained.

MODE OF PREPARING.

Turnbull gives two processes; the former being the more easy of manipulation; the latter yielding a purer result, and on the whole being preferable.

A quantity of the fresh root of the aconitum napellus, being very carefully and cautiously dried and reduced to powder,—one part of it by weight, and two parts by measure, of strong alcohol, are to be digested together at a gentle heat for seven days, and the tincture, whilst warm, is to be filtered. It must then be reduced to the consistence of an extract, by careful evaporation, at a low and well regulated temperature; the object of this being to prevent the destruction or expulsion of the active principle, which would very probably ensue, if the temperature employed were higher than barely sufficient to carry off the alcohol. To the extract, thus prepared, liquid ammonia is to be added, drop by drop, and mixed well with it, to precipitate the alcaloid; in this part of the process care must be taken that too much be not added, as in some instances the product appears to have been decomposed by inattention to this circumstance. It is not easy to give a precise rule as to the quantity; but enough will have been added, if the extract exhales the odour of ammonia when stirred. The mass now consists of impure aconitine, mixed with a quantity of extractive, and other matters soluble in water, and it may be taken up either by

¹ Trommsdorf's *Journal der Pharmacie*, v. 84.

² On the medical properties of the natural order Ranunculaceæ, and more particularly on the uses of *sabadilla* seeds, *delphinium staphysagria* and *aconitum napellus*, and their alcaloids, *veratria*, *sabadilline*, *delphinia* and *aconitine*, chap. iii. Lond. 1835.

boiling alcohol, or by sulphuric ether; or the soluble matter may be removed by repeated washings with small quantities of cold water, which will leave the aconitine. This latter process, Turnbull says, is the one he has generally employed, and it is performed by pouring a little water on the extract, and mixing them carefully together; then allowing the undissolved part to subside, pouring off the fluid, and repeating the operation as long as any soluble matter is taken up; a quantity of light brown or gray powder is left, which may be purified by subsequent solution in alcohol. This powder contains the active properties of the aconite, in a high degree of concentration.

The second process consists in dissolving the alcoholic extract, prepared as above, without the addition of the ammonia, in as much cold water as will take it up, and carefully decanting the solution from the insoluble part, and filtering it. To the filtered solution liquid ammonia is to be added, drop by drop, as long as any precipitation is occasioned. When the precipitate has subsided, the supernatant fluid must be carefully poured off, or drawn off by means of a syphon; and after the precipitate has been deprived of as much of the fluid as possible, it should be purified by a sufficient number of washings with small quantities of cold water, or, what is better, it may be dissolved in as much alcohol as will take it up, and the solution be thrown into cold water; the precipitate thus formed is to be carefully dried. The product obtained by this process is white.

Well prepared aconitine, according to Geiger, is a firm, colourless, and translucent mass; of a shining appearance, friable and inodorous: the taste is disagreeably bitter, leaving behind it an acrid sensation in the throat, but not corrosive or burning. The aconitine does not dissolve readily in water; at the ordinary temperature it requires one hundred and fifty parts thereof, but only fifty parts of boiling water. Tincture of iodine occasions in the solution a reddish brown precipitate; the tincture of galls a white one. It forms, with the acids, for the most part, salts that are not crystallisable, which readily dissolve both in water and spirit of wine.

EFFECTS ON THE ECONOMY.

The effects of aconitine appear to be essentially analogous to those of delphinine. A grain of the first of the two preparations described by Turnbull, was dissolved in a dram of alcohol:

twenty drops of the solution put into the mouth of a guineapig occasioned death in a few minutes. Other experiments, too, have been performed, all of which demonstrate the extreme activity of the substance. If a grain or two of aconitine or veratrine or delphinine be mixed up with a little lard, or dissolved in a dram of alcohol, and a small quantity be rubbed on the skin, a sensation of heat and tingling is experienced after the friction has been persevered in for a minute or two. There is a slight difference, however, in the effects produced, and the resemblance is greatest between those of the delphinine and the aconitine.

When a small quantity of aconitine, says Turnbull, either made into an ointment, or dissolved in alcohol, is rubbed for a minute or two upon the skin, a sensation of heat and prickling is experienced; to this succeeds a feeling of numbness and constriction in the part, as if a heavy weight were laid upon it, or as if the skin were drawn together, by the powerful and involuntary contraction of the muscles beneath. This effect lasts from two or three to twelve or more hours, according to the quantity rubbed in. So small a portion as the one hundredth part of a grain has produced a sensation that has continued a whole day.

Whilst employing the aconite itself in his clinical practice, Dr. Lombard,¹ of Geneva, tried its effects on animals, and chiefly in reference to its action on the heart. The experiments were made on frogs, whose hearts beat with great regularity, and for a considerable time after the animal has been mutilated. The medicine was introduced into the stomach or applied locally to the heart, which was laid bare after the animal had been stupified by blows on the head. He found, that the aconite employed internally rendered the pulsations less frequent, without irregularity, and consequently that it exerted a decidedly sedative effect on the heart; whence he infers, that it is a proper remedy in active diseases of the heart, and indeed in inflammatory affections in general, in which he exhibited it with success. In cases of poisoning by it, the contractions of the heart have been found diminished, and almost suspended,² and the homœopathists regard it to be an energetic antiphlogistic.

The diseases, in which Turnbull chiefly employed aconitine externally, were of the neuralgic kind; but he used it as well in gouty and rheumatic cases, and its success, he remarks, fully

¹ Gazette Médicale de Paris, Oct. 10, 1835.

² Orfila, Toxicologie, ii. 221.

answered his anticipations. He employs it either in the form of solution in alcohol, in the proportion of one or more grains to the dram,—or of ointment, made according to the following formula :

℞. Aconitini, gr. ij.
Alcohol. gtt. vj. Tere optimè
et adde Axungia, ʒj. ut fiat unguentum.

The alcohol is added to prevent the aconitine from forming a thick compound with part of the lard, so as to render it difficult to make a proper ointment. In one case of *tic douloureux*, of extreme severity, as much as eight grains was prescribed in the ointment with the most marked benefit. The best mode of applying it is simply to rub a small portion of it over the whole seat of the affection, until the pain is either for the time removed, or until the full effect, described above, is induced on the cutaneous nerves, and the friction should be repeated three or four times, or more frequently, during the day, according to the effect on the disease; the proportion of the aconitine being increased at every second or third rubbing.

Turnbull found, in the case of the aconitine—as well as in that of the veratrine, and the delphinine,—that unless the friction occasioned a full development of the peculiar impressions caused by the aconitine, when rubbed on the skin, no benefit whatever was to be looked for from its employment; and he observes, that if there be the slightest abrasion of the skin, an application of such activity should not be resorted to; and that it should be carefully kept from coming in contact with any of the mucous membranes.

Mr. F. C. Skey¹ details two cases which were cured by it. It was rubbed down into an ointment with lard, in the proportion of one grain of the former to one dram of the latter, and applied in a small quantity by the forefinger over the track of the painful nerve, and was gently rubbed or rather smeared over the surface for half a minute or longer, once or twice a day, according to the degree of pain.

Turnbull likewise advises the external application of an *ammoniated extract of aconite*, which is made by evaporating very carefully, and at a low temperature, the tincture of the dried root of the plant, prepared as directed in the process for obtaining aconitine, to the consistence of an extract. To every dram of this, eight or ten drops of liquor ammoniæ should be added, and after

¹ London Med. Gaz. Nov. 5, 1836.

the mixture has stood a short time in a very gentle heat, to drive off the excess of ammonia, it may be used in the form of an ointment, according to the following prescription :

℞. Ext. aconit. ammon. ʒj.
Axung. ʒiij. Misce ut fiat unguentum.

When this ointment is rubbed upon the skin, it occasions sensations in the part similar to those produced by the aconitine ointment; they are, however, rather more pungent.

In less severe cases, Turnbull advises the simple saturated tincture of the dried roots, with or without the addition of a little ammonia.

The alcoholic extract of aconite has likewise been advised by Dr. Lombard, of Geneva,¹ in articular rheumatism. He gives it in doses of half a grain every two hours, and gradually augments the dose to six or nine grains in the same period.

ACUPUNCTURA.

SYNONYMES. Acupuncture; Acupuncturation.
German. Die Akupunktur; der Nadelstich.

Although acupuncturation is really an ancient therapeutical agent, attention to it has been so much revived of late years, and its use has been so largely extended, that it may be looked upon as constituting one of the novelties of therapeutics.

It consists in the introduction of needles into different parts of the body with the view of removing or mitigating disease; and appears to have been entirely unknown to the Grecian, Roman, and Arabian physicians.² From the most ancient times, however, it has been in use with the Chinese and Japanese, by whom it was regarded as one of the most important of remedial agencies. By these people it was systematically taught on appropriate phantoms or mannekins, called *T'soe-Bosi*, and the practice of the operation was permitted to those only who were able to pass a rigid exami-

¹ Gazette Médicale, Juin 28, 1834. See, also, Dr. Sigmond, in Lancet for August 5, 1837.

² V. A. Riecke, Die neuern Arzneimittel u. s. w. S. 12, Stuttgart, 1837.

nation thereon. In Europe, it was first known about 156 years ago, from the writings of a Dutch surgeon, Ten-Rhyne, who wrote in 1683;¹ and attention was subsequently drawn to it by Kämpfer;² but after this it was almost forgotten, until Berlioz, in 1816, drew attention to its employment. His example was soon followed by Béclard,³ Brétonneau,⁴ Haime,⁵ Demours,⁶ Sarlandière,⁷ Pelletan, Ségalas, Dantu, Velpeau, Meyranx,⁸ Dance, in France; by Churchill, Scott, Elliotson,⁹ and others, in England; by Friedrich,¹⁰ Bernstein,¹¹ L. W. Sachs, Heyfelder, Michaelis,¹² Gräfe,¹³ and others, in Germany; by Carraro,¹⁴ Bergamaschi,¹⁵ Bellini, and others, in Italy; and by Ewing,¹⁶ E. J. Coxe,¹⁷ Bache,¹⁸ and others, in this country.

M. Jules Cloquet had much to do in reviving its employment in his own country and elsewhere, by his treatise on the subject published at Paris, in 1826, where it was for a long period a fashionable article in the hospitals; so much so, it is affirmed, that attempts were even made to heal a fractured bone by it without the application of any appropriate apparatus! and at one time, it is said, the patients in one of the hospitals actually revolted against the *piqueurs médecins*!¹⁹

¹ Mantissa schematica de acupunctura ad dissert. de arthritide. London, 1683.

² Amœnitat. exotic. politico-physico-medic. p. 583. Lemgov. 1712; and his History of Japan, vol. ii. Appendix, sect. 4, p. 34.

³ Mem. de la Société Médic. d'Emulation, viii. 575.

⁴ Journal Universel des Sciences Méd. xiii. 35. Paris, 1817.

⁵ Journal Génér. de Médec. tom. xiii. and Journal Univers. des Sciences Médic. tom. xiii. 1819.

⁶ Ibid. tom. xv.

⁷ Mem. sur l'Electropuncture. Paris, 1825.

⁸ Archives Générales de Méd. tom. vii. Paris, 1825.

⁹ Med. Chir. Trans. xiii. 467. Lond. 1827; and art. Acupuncture, in Cyclop. Pract. Med. Lond. 1832.

¹⁰ Translation of Churchill's work in German, p. 40.

¹¹ Hufeland's Journal, lxvii. Berlin, 1828.

¹² Gräfe und Walther's Journal, B. v. St. 3. S. 552.

¹³ Gräfe, in art. Acupunctur, in Encyc. Wörterb. der medicinisch. Wissenschaft. B. i. S. 312. Berlin, 1828.

¹⁴ Annali Universali d'Omodei, 1825.

¹⁵ Ibid. 1826.

¹⁶ North Amer. Med. and Surg. Journal, ii. 77. Philad. 1826.

¹⁷ Ibid. ii. 276. Philad. 1826.

¹⁸ Ibid. i. 311. Philad. 1826; and art. Acupuncture, in Cyclop. of Pract. Med. i. 200. Philad. 1833.

¹⁹ Riecke, Op. cit. S. 13.

MODE OF ADMINISTRATION.

In the operation of acupuncture, needles are employed, which are very fine, well polished and sharp pointed. They are usually from two to four inches long, the length being adapted to the depth it may be desired to make them penetrate. If steel needles are selected, they are heated to redness, and allowed to cool slowly, in order that they may be less brittle. At the blunt extremity of the needle, a head of lead or sealingwax is attached to prevent it from being forced entirely into the body. This is the simplest method of acupuncturation, and it is as effectual as any other. By various acupuncturists, needle-holders or handles of ivory have been devised, to some of which the needle is permanently attached. Perhaps the *porte-aiguille* or needle-holder recommended by Dr. F. Bache,¹ of this city is as good as any that has been invented. The needle, with its *porte-aiguille*, consists of a handle with a steel socket to receive the end of the needle, which may be fixed securely, after having been inserted, by the pressure of a small lateral screw. By this construction, the operator can at pleasure fix in the handle a needle of such length as he may desire, and after inserting it he is enabled to detach the handle by relaxing the screw. After all, however, needles prepared in the simple manner mentioned above, are adequate to every useful purpose.

Besides the common steel needles, those of gold, silver, and platina have been used, but it does not appear that one metal is preferable to another.

To introduce the needle, the skin is stretched, and the needle inserted by a movement of rotation performed in opposite directions, aided by gentle pressure. As a rule, the seat of pain will indicate the place where the needle should be introduced; but where the feelings of the patient do not indicate the spot, it must be suggested by our knowledge of anatomy and physiology. From the experiments of Béclard, Brétonneau, Ségalas, Dantu, Velpeau, and others, it would appear, that perforation of arteries, nerves, and even of important viscera with very fine needles has not been followed by any injurious results; yet, at times, accidents have been produced thereby; and, therefore, it may be laid down as a rule, that the greater nerves, and arteries of a certain size, should be avoided. Prudence would likewise suggest, that important viscera, as the heart, stomach, intestines, &c. should not be penetrated.

¹ Cyclop. p. 202.

The number of needles to be used varies according to the extent of the affected parts. In the opinion of many experienced physicians, we ought not to be afraid of the number, but rather insert too many than too few, and not at too great a distance from each other.

The length of time, during which the needle should be suffered to remain in the part, differs; no fixed rule can be laid down. Some suffer them to remain for an hour and a half or two hours; at times, a period of five minutes is sufficient. In other cases, they have been kept in for two or three days. It appears to be by no means settled what medicinal influence is exerted by their longer or shorter continuance in the parts.

EFFECTS ON THE ECONOMY.

We have already alluded to the impunity with which, in the generality of cases, acupuncture may be practised even on important organs.

As respects the nerves, Cloquet has seldom or never seen the puncture of them give rise to so much pain as to render it necessary to withdraw the needles; the pain was generally trifling and speedily passed away. He inserted needles into the brain and spinal marrow, and into the crural nerve of a cat, without any evidence of severe suffering or of change of function. Similar experiments were made by E. Gräfe with the same results.¹

Nor was inconvenience found by Delaunay, Béclard and Cloquet to be sustained on puncturing the arteries and veins. A few drops of blood perhaps issued, and the flow was readily stopped by pressure with the finger. The slight ecchymosis, which, at times, supervened, disappeared rapidly of itself. In Gräfe's experiments, he never found much bleeding to ensue, although he properly esteemed it advisable to keep clear of the nerves and blood vessels, in order to avoid any unnecessary pain or mischief.

As regards the fasciæ and periosteum, Gräfe found, that the insertion of needles into them was always very painful, and he recommends, therefore, that the operation should be performed with care on those parts. Should, however, the needles be introduced, and much pain be experienced, it rapidly ceases when they are withdrawn.

Lastly—MM. Haime, Brétonneau, Velpeau, and Meyranx, in-

¹ Art. Acupunctur, in Encyc. Wörterb. u. s. w. S. 317. Berlin, 1828.

stituted several experiments on dogs by passing needles into the brain, heart, lungs, stomach, &c. and little or no inconvenience, as we have remarked above, was experienced, provided the needles were extremely fine. Cloquet passed his needles so deeply into the chest of an animal as to leave no doubt that they had penetrated the lungs, and he subsequently pierced the liver, stomach, and testicles without the supervention of any unpleasant results.

The pain occasioned by acupuncture is generally easily tolerated, but at times it is so violent, that the patients cry out; the violence, however, usually passes away either when the needle is drawn out or forced in deeper. It would seem that the operation is, as a general rule, most successful when it occasions the least pain. Cloquet asserts, that a kind of electric shock is sometimes experienced in the surrounding parts at the moment of the introduction of the needle; in other cases, a tremulous motion is observable in the fibres of the muscles penetrated. Almost always, some time after the entrance of the needles, a more or less regular areola or halo of a red colour, and without tumefaction, is perceptible around the needles, which soon disappears after they are withdrawn; but when they are suffered to remain long in the part it may persist for hours.

When the operation is productive of benefit, relief is speedily experienced.

The extraction of the steel needles is ordinarily accompanied by more pain than their insertion, especially if they have penetrated deeply, and been retained in the flesh for a long time. The difficulty is owing to their having become oxidised, and consequently rough on the surface. In withdrawing them, it is advisable to give them a movement of rotation, and at the same time to press upon the skin surrounding them with the thumb and index finger.

In the hospitals of St. Louis, La Pitié, and Hôtel Dieu, of Paris, acupuncture was practised some thousands of times, and in every case, according to Guersent, without the occurrence of any thing unpleasant. Pelletan, however, affirms, that he saw it on four occasions followed by slight faintness at the hospital St Louis, but none of the cases assumed the characters of full syncope. Gautier de Claubry has frequently seen faintness, febrile movements, spasm, and insupportable pain produced by it, and Heyfelder saw it followed by convulsions and fainting. Béclard has related a case where the needle penetrated to the bone, and occasioned intense pain. The patient remained a long time faint, and afterwards

violent delirium ensued, which gradually ceased in the course of the day, and was followed by great debility. Subsequently, an abscess formed in the part in which the operation was practised.

As to the *modus operandi* of acupuncture, we cannot conceive its effects to be any thing more than the new nervous impression, produced by the needle in the parts which it penetrates. The needles having been found oxidised, especially at the point, it has been supposed by some that the oxidation is connected with the remedial agency, and it has been even affirmed, that in some diseases they oxidise more readily than in others.¹ It is a sufficient reply to this view, that beneficial results are obtained from the use of needles made of metals that do not become oxidised, and that the steel needles oxidise in the sound as well as in the diseased body, and even in parts that have been removed from the body, and placed in warm water; for in the cold dead body, it is affirmed, the phenomenon is not observed. Cloquet and Pelletan think, from their experiments, that the effects of acupuncture are a consequence of the development of the nervous fluid—which they liken to the galvanic—around the needles; a view which is denied by Pouillet and Béclard, but adopted in a modified form by Dr. Bache,² who throws out the conjecture, “that in many cases of local pain this accumulation of the nervous (electrical) fluid depends upon the altered state of the various fasciæ or condensed sheets of tissue, giving them the power, to a certain extent, of insulating the parts which they serve to embrace.” The explanation is ingenious, but we do not think it necessary, if adequate, to explain the phenomena. We have no doubt, that the effects are owing to a concentration of the nervous power towards the part transfixed by the needle, so that a derivation of the nervous influx is induced towards the seat of pain or towards the nerves particularly concerned in the production of the pain; but further than this we know not.

There is one phenomenon, by the way, which is dependent on the oxidation of the needle. When the free extremity of an inserted needle is connected with the ground by means of a conducting substance, or is put in connection with a soft part of the patient's body, it becomes the seat of a galvanic current, which is exhibited by the multiplier of Schweiger. That this phenomenon is dependent upon the oxidation of the metal is proved by the circumstance, that it does not take place when an unoxidisable metal is employed.³

¹ Gräfe loc. cit. S. 319.

² Op. citat. 305.

³ Riecke, S. 16.

Acupuncturation has been used by Berlioz¹ in gouty and rheumatic cases; by Haime in rheumatic, spasmodic, and convulsive affections, and by Demours in amaurosis and ophthalmia, the needles being inserted in the temples; Finch advised it in anasarca practised on the feet; he also discharged, in this way, the fluid of ascites.² Pipelet³ employed it advantageously in a violent convulsive affection. The needles did not remove or markedly diminish the symptoms, but they postponed their recurrence. Michaelis⁴ cured a case of rheumatism by it, but he did not find it so serviceable in œdema of the feet, as the fluid would not flow readily through the minute apertures. Friederich proposed, that in cases of asphyxia, when every other remedy had been employed unsuccessfully, the cavities of the heart should be penetrated by a needle to excite its contraction, and this plan was subsequently advised by Carraro,⁵ who found, from his experiments on cats, that they could in this way be resuscitated after drowning, when every manifestation of vitality had ceased. His experiments, however, when repeated by Dr. E. J. Coxe,⁶ of Philadelphia, were not found to succeed. J. Cloquet obtained the happiest results from acupuncturation in neuralgia, rheumatism, muscular contractions, spasms, pleurodyne, cephalalgia, ophthalmia, toothach, epilepsy, gout, gastrodynia, contusions, lumbago, periodical amaurosis, diplopia, paralysis, &c.

It is in rheumatic affections that its success has been most marked. Dr. Elliotson⁷ cured 30 out of 42 cases by it in St. Thomas's hospital. In sciatica its efficacy has been evident.⁸

By Velpeau it has been proposed to cure aneurism by acupuncturation. In performing some experiments on animals he found, that arteries punctured by the needle became the seat of a coagulum, and were ultimately obliterated. In 1830, he read a paper before the Académie des Sciences, of Paris, proposing the operation in the cases in question.⁹ He found in his experiments, that

¹ Op. citat. Paris, 1816.

² Lond. Med. Repos. Mar. 1823.

³ Journal Complém. du Dict. des Sciences Médic. t. xvi. 1823.

⁴ Gräfe und Walther's Journal, B. v. St. 3.

⁵ Annal. univ. di Medicin. 1825.

⁶ North Amer. Med. and Surg. Journal, ii. 292.

⁷ Art. Acupuncture, Cyclop. pract. Med.; Lond. 1832.

⁸ Renton, in Edinb. Med. and Surg. Journ. for 1830, xxxiv, 100, and Dr. Graves in Lond. Med. Gaz. July, 1831, and Lond. Med. and Surg. Journal, April, 1833.

⁹ Lond. Med. Gaz. and Amer. Journal of Med. Sciences, Aug. 1831, p. 510.

whenever the needle remained three days in the flesh, the trans-fixed artery was completely obliterated.

M. Bonnet, Chirurgien-en-chef to the Hôtel Dieu at Lyons,¹ has affirmed, that he treated eleven cases of varicose veins by introducing pins through their cavities, and allowing them to remain there some time. Nine of these cases were cured. The same treatment was applied to herniary sacs. He passed three or four pins through the herniary envelopes close to the inguinal ring, and in order that they might exert a certain degree of compression, as well as of irritation, on the sac, he twisted the points and heads upwards so as to give them a circular direction. The inflammation and pain usually commenced on the third or fourth day after the operation, and the pins were removed a few days afterwards. M. Bonnet had treated four cases of inguinal hernia by acupuncture. In two, the hernia was small, and three weeks sufficed for the cure: the third was more troublesome.

Caution is of course requisite not to injure the spermatic cord.

Of late, acupuncture has been revived² in the treatment of hydrocele by Mr. Lewis, Mr. King,³ and others.

It consists in carrying a common sewing needle—of the size used for sewing a button to a shirt—through the skin, the dartos and cremaster, into the bag containing the fluid, so that a drop of the fluid follows the instrument as it is withdrawn. It is executed in nearly the same manner as the ordinary method of tapping with a trocar, except that the needle, which should be oiled, cannot be plunged in so easily as that instrument. Mr. King suggests that the needle should be fixed in a handle, by which means it can be made to enter with comparative facility. After the operation, a compress, moistened with a discutient lotion, may be kept on the scrotum, and the patient may walk about or remain at rest, as may best suit him.

The phenomena which present themselves in a few hours are as follows:—the swelling begins to be less circumscribed, and to lose its tenseness, and the cellular tissue of the scrotum becomes gradually more and more infiltrated with the fluid, which before distended the tunica vaginalis, and which, in the space of from twenty-four to forty-eight hours, will, according to Mr. King, have entirely

¹ Bulletin Générale de Thérapeutique, and Dunglison's American Medical Intelligencer, for Dec. 1, 1837, p. 317.

² Mr. Travers, in Lond. Med. Gazette, Feb. 1837, p. 737. Mr. Lewis, Ibid. Feb. 1837, p. 788. Mr. Robert Keate, Ibid. p. 789.

³ British Annals of Medicine, No. 1, p. 13.

changed place. In five or six days, the infiltration disappears, and the patient is cured.

Mr. Lewis first introduced the method as a palliative cure, but he has seen cases where a radical cure was effected by it.¹ He considers the principle of puncturing with a fine pointed needle not only applicable to promote the absorption of the fluid in hydrocele, but in every case of encysted dropsy.²

We have already referred to the use of acupuncture in anasarca. We have used it advantageously in these cases to drain off the fluid from the cellular membrane; in such cases larger needles are needed; some prefer them to be of the size of an ordinary glover's needle, and of a triangular shape; a puncture of this kind being less likely to close.³

In the mass of cases, it need scarcely be said, this course can act merely in a palliative manner, the cause of the dropsical accumulation still persisting. Still, as Dr. Graves has remarked, under favourable circumstances and in a good constitution, the simple operation of evacuating the fluid by punctures made through the skin, has been, of itself, sufficient to effect a cure.

In a lady, under his care, a general anasarca came on after fever, and resisted every form of treatment he could devise. When he had made many fruitless attempts to produce absorption by means of internal remedies, another practitioner was called in, who practised acupuncture of the lower extremities, and succeeded completely.

Lastly, Mr. Vowell⁴ has published a case in which acupuncture was successfully employed for the removal of a ganglion. A young lady under his care had been affected with a ganglion of a considerable size on the extensor tendons of the foot, which produced not only disfigurement, but some uneasiness. Mr. Vowell applied blisters, and afterwards the iodine ointment and pressure, for above a month, without benefit. He then inserted the *tambour porte-aiguille* of his patient. Pressure was applied, and within a week the tumour had completely disappeared.

When acupuncture is conjoined with electricity or galvanism, it constitutes *electro-puncture*, and *galvano-puncture*. (q. v.)

¹ Dr. Davidson, in Edin. Med. and Surg. Journal for Jan. 1838.

² Lancet, May 7, 1836, and Jan. 14, 1837.

³ Dr. Graves, Lond. Med. Gazette, Oct. 1838. See, also, Mr. King, Ibid. Oct. 7, 1837, and Nov. 25, 1837.

⁴ Lancet, Aug. 25, 1838, p. 770.

ÆTHER HYDROCYANICUS.

SYNONYMES. *Æther Prussicus*, Hydrocyanic, or Prussic Ether.

German. Cyanäther.

This preparation was discovered a short time ago by Pélouze,¹ and, according to Magendie,² it resembles in its effects the hydrocyanic acid, without being so violent a poison, and, consequently, he esteems it worthy of regard as an addition to the *materia medica*.

MODE OF PREPARING.

Equal parts of sulpho-vinate of baryta and cyanuret of potassium are mixed intimately together, put into a glass retort, to which a tubulated receiver is adapted, and exposed to a moderate temperature. By distillation, a colourless, or slightly yellowish fluid is obtained, which separates into two distinct strata. The lighter consists chiefly of hydrocyanic ether, which is not pure however, but mixed with water, alcohol, sulphuric ether, and hydrocyanic acid. In order to purify it, it must be strongly shaken, and, with four or five times its bulk of water, must be exposed for some time to a temperature of 60° or 70° centigrade: it must be again agitated with a little water, decanted, suffered to remain in contact with chloride of lime for twenty-four hours, and then distilled. The ether thus obtained is pure. It is a colourless fluid, of a penetrating, disagreeable garlicky odour. Specific gravity 0.78. It boils at 82° centigrade; is very slightly soluble in water, but soluble in every proportion in alcohol and sulphuric ether. In its pure state it does not disturb a solution of nitrate of silver. It inflames very readily, and burns with a blue light. Caustic potassa decomposes it with difficulty, and only when highly concentrated.

EFFECTS ON THE ECONOMY.

Six drops of this ether placed in the throat of a dog, occasioned, in a short time, deep respiratory efforts: the dog fell on its side and convulsions succeeded, with considerable motion of the paws. This

¹ *Journal de Pharmacie*, **xx**, 399. Paris, 1833.

² *Formulaire*—dernière édition.

condition continued for four minutes, after which the effects gradually disappeared, and in the course of half an hour passed away. Six drops injected into the jugular vein rapidly caused death, with symptoms similar to those induced by the hydrocyanic acid. According to Magendie, these experiments were frequently repeated by him with different modifications, after which he ventured upon its administration in disease. He added six drops of the ether to a mucilaginous linctus, and prescribed it to a patient labouring under hooping cough, who, in the course of a few days, derived signal benefit from it, and without complaining of its penetrating, disagreeable odour. The same good effects happened to several patients to whom he gave it in the Hôtel Dieu. But although the results were favourable in cases in which the hydrocyanic acid was indicated, he found it necessary to discontinue its use, on account of the invincible nausea which its smell induced. Magendie advises it in those diseases in which mixtures of the hydrocyanic acid have been found of service.

AQUA AMYGDALARUM, (CONCENTRATA.)

SYNONYMES. Water of Bitter Almonds.

French. Eau d'Amandes Amères.

German. Bittermandelwasser.

The water of bitter almonds has been received into many of the modern Pharmacopœias;—into those of Bavaria, Paris, Ferrara, Hanover, Hesse, and Prussia, for example.

METHOD OF PREPARING.

The Pharmacopœia of Prussia directs it to be prepared in the following manner:—Take two pounds of bitter almonds, bruise well, and add—whilst triturating them—ten pounds of spring water, and four ounces of highly rectified spirit of wine. Let the mixture rest for twenty-four hours in a well closed vessel, and then distil two pounds. The product must be kept in a well stopped bottle.

The inequality in the strength of the aqua lauro-cerasi and of

the medicinal hydrocyanic acid suggested this preparation, which was extolled by Hufeland for its uniformity. Its effect is entirely like that of the aqua lauro-cerasi, but its greater regularity in strength and action has not been confirmed.

Giese found the quantity of hydrocyanic acid contained in the product of the above formula half less than that in the cherry laurel water; and Jörg, from his experiments upon himself and others, proved it to be much weaker and more uncertain.

Neither this preparation, nor the distilled aqua lauro-cerasi, is employed in this country, or in Great Britain. Every objection made to the hydrocyanic acid seems to be equally applicable to them.

AQUA BINELLI.

SYNONYMES. Aqua Balsamica Arterialis.

German. Binellisches Wasser.

Not many years ago, this Italian nostrum was vaunted throughout Europe, as a styptic in every kind of hemorrhage—both when internally and externally administered. By several enlightened Italian physicians—Cotugno, Antonucci, Santoro, and others, it was found highly serviceable, and Gräfe thought, at first, that he had observed good effects from it. Subsequently, however, not only he but Simon, Dieffenbach, and Dr. John Davy,¹ found that it was not possessed of more efficacy than simple cold water.

The new hæmostatic received its name, *Acqua Binelli*, from Dr. Fidele Binelli, the inventor. It was a perfectly transparent fluid, almost tasteless, having a slightly empyreumatic odour; but neither the presence of salt, alkali, earth, nor acid, could be detected by the senses.

The first public trials, to test the efficacy of the liquid in arresting hemorrhage, were instituted at Turin, in 1797, by order of the government, the results of which were esteemed favourable. Soon after this Binelli died, and the secret for making the preparation is said to have died with him; but in the years 1829 and 1830, the successors of Binelli affirmed, that they had discovered the secret,

¹ Edinburgh Medical and Surgical Journal, July, 1833.

and fresh experiments were instituted and repeated in Germany. Various blood-vessels were divided on animals;—the femoral and carotid arteries, and the internal jugular veins—and the cuts were made in every direction; some longitudinally, some obliquely, others completely across, and, in all cases, the hemorrhage yielded as soon as charpie, or lint, steeped in the acqua binelli, was applied and pressed gently against the wound for five or ten minutes.

Encouraged by the results of these experiments, the liquid was tried on man and with advantage; but it was soon found, that the results were not owing to any properties of the liquid, but to the cold, moisture, and appropriate pressure.

The author has given the results of the experiments and observations of Dr. John Davy in another work.¹ They convey interesting information as regards the physiology, pathology, and therapeutics of wounded vessels, and impart a useful lesson to the enquirer—not to deduce inferences from inadequate data, without having investigated every collateral circumstance that may bear upon a question. The results of Dr. Davy's experiments show how hemorrhage from wounding a large artery, which would be speedily fatal, may be readily arrested by moderate compression with several folds of linen or cotton moistened with water; and they further show how, under this moderate compression, the wound in the artery may heal, and the vessel remain pervious, without the supervention of aneurism. Dr. Davy lays stress on moderate pressure, such as may still allow the blood to pass through the canal of the artery.

It has been suggested, that the acqua binelli may be indebted for its fancied hæmostatic property to creosote in some form, but Dr. Davy's explanation appears all sufficient to account for the phenomena. Under these circumstances we may follow the example of Riecke,² and pass it by with this cursory notice.

¹ General Therapeutics, p. 198. Philad. 1836.

² Die neuern Arzneimittel. S. 28. Stuttgart, 1837.

AQUA PICEA.

SYNONYMES. Tar Water, Aqua Picis, Infusum Picis Liquidum seu Picis Empyreumaticæ Liquidæ, Potio Picea.

French. Eau de Goudron.

German. Theerwasser.

This preparation, at one time so much extolled, and recommended on the authority of the celebrated Bishop Berkeley, but which had almost fallen into total disuse, has been recently revived, more especially since it has been found to contain creosote. It was first employed extensively in England about the middle of the last century, and was drunk not simply as a therapeutical but as a prophylactic agent, so that, Riecke facetiously remarks, almost as much tar-water was consumed by the inhabitants of London, as beer and other drinks !¹

As commonly happens in such cases, practitioners passed from one extreme to the other, and as they gradually found the tar-water was not capable of accomplishing *all* that had been ascribed to it, they ultimately neglected it altogether. Still, formulæ for its preparation exist in many Pharmacopœias—in those of Dublin, Bavaria, Brunswick, Paris, Russia, Saxony, Sweden, and Wirtemberg, for example.

The water takes up from the tar a small portion of acetic acid, creosote, and resinous matter ; and it was formerly much praised as a remedy in pulmonary consumption, and as a diuretic ; its virtues, however, appearing to rest almost wholly on the contained creosote.

Some years ago, Arnheimer, of Duisburg, recalled the attention of practitioners to it as a remedy in many chronic cutaneous affections, especially of the herpetic kind ; and he asserted, that he found no remedial agent more valuable when its use was persevered in for one or two months to the extent of a pint or two daily. Arnheimer directed patients to prepare it for themselves in the following manner. A pound of tar was put into a deep porcelain dish, and a quart of water poured upon it ; for half an hour it was stirred with a spoon ; the mixture was then allowed to stand for

¹ Die neuern Arzneimittel. S. 38. Stuttgart, 1837.

twenty-four hours ; the tar remaining on the surface of the water was skimmed off, and the clear fluid put into well stopped bottles.

He advises, that a large quantity should not be prepared at once, as the water in time becomes ropy and its golden yellow colour is changed to a darker hue. It is generally taken without any repugnance.

Since the discovery of creosote, tar water has received fresh consideration, and it is not improbable that it may come again into more general use, as it appears, from recent experiments, that there are cases where it would seem to merit a preference over creosote. M. Pétrequin has lately made some trials with both in chronic catarrh, and in different stages of phthisis.¹

The number of cases communicated by him is twenty-three ; of these seven were cases of chronic catarrh, in which creosote was given ; generally the cough was mitigated by it, but in two cases no effect was produced on that symptom. The expectoration was usually diminished or facilitated ; in two cases, however, no advantage was derived from creosote, and in one case the sputa were bloody. In the majority of the cases, the dyspnœa ceased ; in others, it continued ; and in the same number of cases the pain in the breast was relieved by its use.

As to its effects on the digestive organs, it several times excited thirst ; but the most marked result was the sensation of burning, which it caused, in the majority of cases, in the digestive tube or in the breast. In two cases it exhibited no influence on an existing diarrhœa, whilst in two others it appeared to diminish the number of the evacuations. In two cases it excited vomiting, and commonly produced nausea. On the whole, in the greater number of cases it appeared to render good service, but in one it was of no avail, and in another it seemed to aggravate the affection.

In four cases of incipient phthisis, treated with creosote, M. Pétrequin obtained the following results. Although in one instance, the cough was aggravated ; in the majority of cases the opposite was the fact. The expectoration was facilitated but diminished in quantity ; the dyspnœa was more or less improved, and in two cases the pain in the chest was relieved. In this disease, also, the creosote excited burning in the epigastrium or chest, and in one in-

¹ Gazette Médicale de Paris, No. 45. Nov. 5, 1836.

stance fugitive sensations of heat and creeping in the limbs. In one case the benefit was striking, in two the improvement was to a less extent, and in one the disease was augmented.

Four other cases were of advanced phthisis. In most of them the cough was more or less improved,—never increased; the oppression remained much the same, but in one case it became more severe. As regards the effects upon the digestive organs, they were much the same as in the first class of cases. The improvement in one case was insignificant; in two others but slight, and in the fourth case the affection was aggravated.

Tar water M. Pétrequin directs to be prepared by digesting an ounce of tar in a quart (*pinte*) of water for eight days, and then filtering. It is taken mixed with milk, and to the extent of from eight to twelve ounces in the day. With this preparation, he treated three cases of chronic catarrh. The cough was always improved by it, the expectoration diminished or facilitated; the dyspnœa alleviated or removed, and the pains in the chest improved or dissipated.

In two cases, it appeared to act beneficially on vomiting which accompanied the cough. The appetite was improved, and in one case diarrhœa appeared to be diminished, whilst in two others, existing constipation yielded during its use. In all the cases, sleep was restored. On the urinary secretion it exerted no influence, and it neither excited thirst nor nausea like creosote.

In three cases of incipient phthisis, its action was more beneficial than that of creosote. The cough was always ameliorated, the expectoration facilitated or diminished, and the dyspnœa and thoracic pain relieved. In one case, it seemed to act favourably on accompanying emesis, and in another to quench the thirst. It excited or improved the appetite, and aided digestion.

In one case of advanced phthisis, the alleviation produced by the tar water was beyond all expectation, but in another the disease had proceeded so far that it was wholly unsuccessful.

So far then as M. Pétrequin's experiments go, they would seem to show that advantage may be derived, in the cases in question, from the administration of creosote and tar water; and that the latter is perhaps possessed of properties which the other has not—to the same degree at least. The cases are, however, too few to enable us to deduce any thing entirely satisfactory.

Fresh experiments will doubtless be instituted, which may ena-

ble us to infer positively on matters that must as yet be considered involved in doubt.¹

We have administered it freely in phthisis, as well as in chronic bronchitis. In the latter affection, it has relieved cases, in which the accustomed excitant expectorants are found to be serviceable. The same has been the fact in the former disease; but farther than this no advantage has accrued from its administration.

In a late French periodical,² some cases are published from the records of the hospitals for 1829 and 1830, during the attendance of the late Professor Dupuytren, in which injections of tar water were successfully administered in catarrhus vesicæ, along with the use of pills of turpentine.

The tar water was made by infusing in the cold, for a night, a pound of tar in ten pounds of spring water, filtering and warming the solution before using it. Large quantities of this were injected through an elastic gum catheter, which was forthwith withdrawn and the patient directed to retain the injection as long as possible. The injection was repeated daily. Venice turpentine was administered internally after the following form:—

℞. Terebinth. ʒj. [?].
Pulv. cujusvis, q. s. Fiant pilulæ xl.

Ten of these were given in the day—the number being gradually diminished, until they were wholly discontinued.

ARGENTI PRÆPARATA.

SYNONYMES. Preparations of Silver.

German. Silberpräparate.

Of the preparations of silver, the nitrate is the only one that has been much used, and this chiefly as an external application. Very recently, however, the attention of physicians has been directed to the internal use of many of those preparations, and especially by M. Serre,³ professor of surgical clinics at Montpellier. This gentle-

¹ Deslandes, Dict. de Médec. et de Chirurgie prat. xi, 233.

² La Lancette Française, Avril 8, 1837.

³ Bulletin Générale de Thérapeutique, 1836.

man commenced his first trials in May, 1835, in the civil and military hospital of St. Eloi. At this time there was an unusual number of syphilitic patients in the wards, of which the most severe and appropriate cases were selected for treatment by the preparations of silver, the chloride, cyanide, and iodide. Trials were also made with the divided metallic silver, the oxide of silver, and the chloride of ammonia and silver. At first these preparations were administered iatroleptically; the chloride, the cyanide, and the iodide in the quantity of one twelfth of a grain; the chloride of silver and ammonia in the quantity of one fourteenth of a grain; and the oxide of silver and the divided silver in the dose of one eighth, and one quarter of a grain, respectively. M. Serre soon found that these doses were generally too small: he therefore raised that of the chloride and the iodide to one tenth and one eighth of a grain, without the slightest inconvenience resulting. The other preparations were also increased in the same proportion, with the exception of the chloride of silver and ammonia, which requires more precaution than any of the other preparations.

M. Serre did not restrict himself to the iatroleptic administration of these substances, but employed them internally in the form of pill, and externally as local applications. The formulæ preferred by him were the following:—

Pulvis Argenti Chlorureti.

Powder of chloride of silver.

- ℞. Argent. chlorur. gr. j.
Pulv. irid. florent. gr. ij.

Reduce to a fine powder, and divide into eight or ten portions; to be rubbed on the tongue.

Pilulæ Argenti et Ammoniæ Chlorureti.

Pills of chloride of silver and ammonia.

- ℞. Argent. et ammon. chloruret. gr. j.
Pulv. irid. florent. gr. ij.
Conservæ flor. tilia q. s. ut fiat massa in pilulas xiv dividenda.

For internal use.

Unguentum Oxidi Argenti.

Ointment of oxide of silver.

- ℞. Oxid. argent. gr. xx.
Axungia, ʒj. Misce, ut fiat unguentum.

When the iodide or cyanide is substituted for the oxide of silver, ten or twelve grains of these may be added to the ounce of lard.

M. Serre describes several cases of syphilis in which the preparations of silver were administered according to the above forms. The first patient was a soldier, 26 years old, of athletic constitution, who, at the time of his admission into the hospital, had several large chancres on the prepuce, so close to each other as to seem to form one large circular ulceration, five or six lines in diameter. After a few days' rest, and the use of baths, M. Serre ordered the chloride of silver in friction on the tongue in the quantity of one twelfth of a grain. The ulcers were treated with simple cerate (*ceratum galeni*) spread on lint. After the second rubbing, the patient experienced violent colicky pains, which were not severe enough, however, to induce a discontinuance of the remedy. Scarcely had a grain of the chloride been employed, when the secretion from the ulcerated parts became less: the surface of the chancres lost the kind of grayish border which they possessed, and the cicatrisation proceeded rapidly. The frictions were continued, and the condition of the patient went on improving. At the end of two months he left the hospital.

In the five subsequent cases the same plan of treatment was pursued. The chloride was used exclusively according to the iatra-leptic method. The symptoms were various; in addition to chancres there was in one case a suppurating bubo; in another, syphilitic vegetations at the margin of the anus; and in a third, fissures in the same part. In the seventh case, in which there were chancres, gonorrhœa, and extensive rugous blotches on the nates, the chloride of silver was rubbed on the tongue, and applied topically in the form of ointment. The eighth patient, who suffered with large condylomata, as well as with ulcers in the neck, took the chloride in pills to the extent of nine grains in the course of the treatment; frictions with the ointment of silver were also applied to the affected parts.

M. Serre deduces from all his experiments the following amongst other conclusions. *First.* The preparations of silver have this great advantage over those of mercury, that they never occasion salivation, nor do they induce in the intestinal canal or in the respiratory organs, the disagreeable effects that are too often caused by mercury. *Secondly.* That should their therapeutical agency be confirmed by experience, and they be introduced into hospital practice, great advantage will be derived as respects the purity of the wards, and the cleanness of the bedclothes, &c. *Thirdly*

That patients can be treated by them in secret as well as when traveling, without fear of detection. *Fourthly.* That the preparations of gold are to be preferred in these respects, but that gold has the disadvantage of exciting too much, and cannot, therefore, be exhibited to those of a nervous and excitable temperament, or who have weak and delicate chests. In such cases the preparations of silver merit the preference. *Fifthly.* The preparations of silver are much cheaper than those of gold, and are, therefore, more available in practice amongst the poor and in large hospitals; and, moreover, they are more easily prepared, which is a consideration of some moment, as regards the *pharmaciens* of small towns. *Sixthly and lastly.* There are cases in which mercurial and gold preparations fail, and where the preparations of silver might be of great advantage.

The observation of others has not confirmed the assertions of M. Serre. M. Ricord¹ employed the various preparations made after the formulæ given by M. Serre, in the same doses; but not being able to observe any effect that could be fairly ascribed to the agents, he ventured upon considerably larger doses, as much, for example, as twelve grains a day of the iodide and cyanide, but without any marked results.

In this country, the preparations of silver have been but little, if at all, used in syphilis.

I. ARGENTI CHLORIDUM.

SYNONYMES. Argentum Muriaticum, A. Salitum, Chloruretum Argenti, Argentum Chloratum, Chloride, Chloruret or Muriate of Silver.

French. Chlorure d'Argent.

German. Salzsaures Silber, Chlorsilber.

The chloride of silver is prepared by the decomposition of a solution of nitrate of silver, by an excess of a solution of chloride of sodium. The resulting product, or the chloride of silver, appears under the form of a flaky, clotted, very thick precipitate: it must now be washed repeatedly with boiling water, and be exposed to the heat of a sand-bath, so that it may dry as speedily as possible.

Chloride of silver prepared in this way, is of a white colour, devoid of taste, and not soluble in water, but soluble in ammonia. In the light it speedily changes, especially when much divided, or

¹ J. J. L. Rattier, La Lancette Française, No. 122, Oct. 13, 1836.

when moist, and assumes a somewhat dark violet hue, as the chlorine is given off.

The chloride of silver suffers no decomposition when united with vegetable matters. It must be dried and kept protected from the light.¹

Its uses have been referred to under the head of the preparations of silver.

II. ARGENTI ET AMMONIÆ CHLORIDUM.

SYNONYMES. Argentum Muriaticum Ammoniatum, Chloruretum Argenti et Ammoniaci, Chloride or Chloruret of Silver and Ammonia.

French. Chlorure d'Argent et d'Ammoniaque.

German. Silbersalmiak, Salzsaures Silberammonium.

This preparation is obtained, when we saturate, by the aid of heat, liquid ammonia with fresh precipitated and carefully washed chloride of silver. The operation must be accomplished at such a degree of heat, that the fluid shall boil once; for if the boiling be continued a few moments and in the open air, no crystals will be deposited on cooling. If the fluid, whilst in full ebullition and preserved from the light, be filtered, very regular crystals will be deposited on cooling, which may be dried between blotting paper, and should be kept in a well stopped bottle.

The chloride of silver and ammonia has a bluish white colour, the peculiar smell of ammonia, and a burning, almost caustic, taste. In the air, it gradually exhales ammonia, and acquires all the properties of simple chloride of silver, without, however, losing the form of the original composition.

If the crystals be kept in the ammonia in which they were formed, they do not experience the slightest change in their colour from the influence of light. When treated with distilled water, the chloride of silver and ammonia is decomposed. A portion saturated with ammonia is again dissolved; yet a much greater portion remains undissolved; this contains only a small quantity of ammonia. The chloride of silver and ammonia experiences the same decomposition through the influence of heat, as when it is exposed to the open air, except that the decomposition takes place more rapidly. It displays nothing extraordinary, when rubbed with organic matters.

¹ On the mode of forming the various preparations of silver, see Chamou, in *Bulletin Générale de Thérapeutique*, No. xvi. Aug. 30, 1836.

This remedy, as was before remarked, has also been used with advantage by Serre in cases of syphilis.

Another preparation, the *Liquor argenti muriatico-ammoniati*, has been long recommended by Kopp, in cases of chronic nervous affections. It is prepared according to the following formula:—

℞. Argent. nitric. fus. gr. x.
Aquæ distillat. ℥ij.

Soluto filtrato instilla liquoris natri muriatici, (Sodæ Muriatis,) q. s. ad præcipitandum. Præcipitatum sedulo ablutum solve in liquoris Ammon. Caust. ℥iss: adde acidi muriatici ℥ij. vel q. s. ut præcipitatio evitetur et argentum muriaticum in statu solutionis permaneat. Pondus fluidi filtrati æquale sit unciiis duabus cum dimidia.¹

This preparation is transparent, but under the effect of light suffers black flakes to be deposited. It is therefore necessary to preserve it in small bottles painted black, in a dark place. In using it, acid substances should be avoided.

Kopp found this *liquor argenti muriatico-ammoniati* of great efficacy in St. Vitus's dance. It may be given to children of about ten years of age, morning, noon, and night, in doses of three drops, gradually raised to six, in a spoonful of distilled water.

III. ARGENTI CYANIDUM.

SYNONYMES.—Argentum Cyanogenatum, Cyanuretum Argenti, Cyanide or Cyanuret of Silver.

French.—Cyanure d'Argent.

German.—Blaustoffsilber, Cyansilber.

This is obtained by permitting a weak solution of hydrocyanic acid to act on a solution of nitrate of silver. The very light white precipitate, formed thereby, must be repeatedly washed with distilled water, and be reduced to dryness in a moderately heated oven. In the preparation of the cyanide of silver, as of the iodide, it is essential to pour on only so much of the fluid in the formation

¹ "Take of fused nitrate of silver, ten grains; distilled water, two ounces: Into the filtered solution drop enough of a solution of chloride of sodium to precipitate. Dissolve the carefully washed precipitate in an ounce and a half of caustic liquid ammonia; add three drams of muriatic acid, or enough to avoid precipitation, and the muriate of silver may remain in a state of solution. The weight of the filtered fluid should be equal to two ounces and a half."

of the precipitate as may be required for the complete decomposition of the nitrate of silver. If too much hydrocyanic acid be used, a part of the precipitate will be separated in the form of the hydrocyanate of silver. If, instead of the hydrocyanic acid, the hydrocyanate of potassa be used, the latter, if added in too great proportion, will unite with the cyanide of silver, and form a soluble double salt.

Cyanide of silver is of a white colour, devoid of taste, not soluble in water, but soluble in ammonia. In the air, the surface very soon becomes of a dark violet hue, similar to that of the chloride of silver under like circumstances.

The cyanide of silver is dry, and should be kept preserved from the light. It experiences no decomposition when mixed with neutral vegetable matters.

Its use in disease has been referred to under the preparations of silver.

IV. ARGENTUM DIVISUM.

SYNONYMES.—Metallic Silver in a state of division.

German.—Zertheiltes Silber.

Pure oxide of silver is placed in a porcelain crucible, and the fire is increased to a dull redness. The product is then allowed to cool, rubbed in an agate mortar, and sifted through a close sieve or bolting cloth.

In this condition divided silver forms a very fine powder, of a white dullish colour; the air has no influence upon it, unless when impregnated with sulphureous vapours.

Besides the use of this preparation in syphilis already referred to, it may be remarked, that the filings of silver, *argentum limatum*, which agree with it in chemical relations, had been administered ten years before in cases of intermittent fever, by Dr. Meyer, of Bückeburg.¹

Notwithstanding the testimony adduced in its favour, it is probably wholly inert, or exerts but a mechanical agency.

¹ Riecke, Op. cit. §. 436.

V. ARGENTI IODIDUM.

SYNONYMES. Argentum Iodatum, Ioduretum Argenti; Iodide or Ioduret of Silver.

French.—Iodure d'Argent.

German.—Iodsilber.

Iodide of silver is obtained by mixing a solution of the nitrate of silver with one of the iodide of potassium. The yellowish flakes, produced by the admixture of the two fluids, are then washed several times with distilled water, and dried in an oven.

In this preparation, also, it is important, that only so much of the reagent should be added as is necessary for the complete decomposition of the salt of silver. A surplus of the iodide of potassium would form with the already precipitated iodide of silver a soluble and crystallisable double salt of iodine, whereby the quantity of the product, which it might be desirable to obtain, would be diminished.

Iodide of silver is of a very pale yellow colour, but becomes, under the action of light and air, of a deeper yellow. It has no taste, and is neither soluble in water nor in ammonia. The latter property serves to distinguish it from the chloride and the cyanide of the same metal. Like the chloride, the iodide must be kept in a dry dark place. Neutral vegetable substances appear to exert no action upon it.

Its properties have been enumerated under the head of the preparations of silver.

VI. ARGENTI OXIDUM.

SYNONYMES. Argentum Oxydatum, Oxydum Argenti.

French.—Oxide d'Argent.

German.—Silberoxyd, Oxydirtes Silber.

This oxide is obtained by the reaction of caustic potassa on a solution of nitrate of silver. The alkaline fluid must be added in excess, and the oxide, which is the product of the decomposition, must be washed several times in a considerable quantity of water, and be dried by moderate heat, and preserved from the light.

In the state of hydrate, the oxide is black; when anhydrous, it appears as an olive greenish brown powder; it is tasteless, and capable of absorbing carbonic acid from the air. Under the long

continued influence of light it is blackened; and at a heat below the obscure red, it is reduced to the metallic condition. To be kept for a long time in the pure state, it must be protected from the light, in a well stopped bottle.

This preparation, which was also recommended by Serre, has been used by Van Mons in syphilis.¹

ARGILLA PURA.

SYNONYMES. Alumina pura, Terra aluminosa pura, Terra Aluminis, Terra bolaris, seu Argillacea pura; Pure Argil or Alumina.

French.—Alumine factice.

German.—Reine Thonerde; reine Alaunerde.

This substance was known in olden times by the name *Armenian Bole*, *Terra sigillata*, &c. in which forms it was always, however, mixed with lime and iron. It was highly extolled as an absorbent, demulcent, diaphoretic and astringent; was employed in hemorrhage, diarrhœa and dysentery, phthisis, poisoned wounds, &c. and was also applied externally in cases of erysipelas. It had almost fallen into complete oblivion, when its use was resumed by some of the German practitioners. With us, it is scarcely ever, if ever, prescribed.

METHOD OF PREPARING.

The purest argil is prepared by drying the sulphate of alumina and ammonia, and exposing it for 20 or 25 minutes to a red heat, in a crucible: the sulphuric acid and ammonia are driven off, and the argil remains behind in the form of a white powder. Formerly, it was prepared by dissolving alum in water, and precipitating the argil from the solution by means of carbonate of potassa or soda, or of caustic potassa. It is affirmed, however, that generally more or less sulphuric acid remained with the earth, so that it required to be purified by repeated washing, until there was no longer any acid reaction. If a still higher degree of purity be needed, the precipitate

¹ Riecke, Op. cit. S. 440.

is dissolved in muriatic acid, and the argil precipitated by caustic ammonia.

The powder, prepared by these methods, is of a white colour and devoid of smell or taste; but it communicates to the tongue a feeling of astringency. When breathed upon, it yields a peculiar earthy smell. It is insoluble in water, but attracts moisture greedily from the air, and forms with it a gelatiniform mass.

EFFECTS ON THE ECONOMY IN DISEASE.

Pure argil was highly recommended by Percival in indigestion attended with predominance of acidity; and it was in such cases extolled by the Dresden physicians, Ficinus and Seiler.¹ According to the former, it merits a preference over all other absorbents, inasmuch as it forms astringent salts with acids. He found it especially useful in diarrhœa and dysentery, particularly in children. Seiler recommended it in the vomiting of infants, which is usually accompanied by acidity, and in the diarrhœa of older children.

Weese,² also employed it successfully in several cases of infantile diarrhœa where there was evidently a predominance of acid. The latest encomiast of the *argilla depurata* is Dürr, who, for several years, has administered it in the diarrhœa and cholera of infants, and has found it highly efficacious.

The chemical reasons, urged by Ficinus and others, merit attention. The article is worthy of employment in affections of the intestinal tube, in which astringents are indicated. The muriatic, and the acetic or lactic acid are always in the stomach when any alimentary or other matter is present there; these acids cannot fail, consequently, to unite with the argil, and the resulting compound must possess astringent properties.

MODE OF ADMINISTERING.

The dose in the 24 hours, for a very young child, is from ʒss to ʒj; for older children, from ʒj to ʒij. Smaller doses are of little or no avail. The vehicle is commonly an emulsion.

The following forms are given by Riecke.³

¹ *Zeitschrift für Natur- und Heilkunde der Dresdner Professoren*, B. I. H. 1, S. 82.

² *Rust's Magazin*, B. xii. H. 2, S. 247.

³ *Die neuern Arzneimittel*. S. 41. Stuttgart, 1837.

Mistura Argillæ.

Mixture of Argil.

- ℞. Emuls. sem. papav. (ex ℥ss. parat.) ℥iiiss.
 Argillæ puræ, ℥ij.
 Syrup. althææ, ℥ss. M.

Dose—A teaspoonful to a child two years old affected with diarrhœa.

- ℞. Argill. pur. ℥ss.
 Gum. arab. ℥j.
 Sacch. alb. ℥ij.
 Aq. scenicul. ℥iij. M.

Dose—The same as the last to a child one year old.

- ℞. Emuls. oleos. cum vitell. ovor. parat. ℥j.
 Syrup. alth. ℥j.
 Argill. depurat. ℥ss.
 Aq. cinnam. simpl. ℥j.
 Extract. cicut. gr. ij. M.

Dose—The same as the two last to a child three months old, affected with cholera infantum.

DÜRR.

ARNICA.

SYNONYMES. Arnica Montana, A. Plauensis, Doronicum Germanicum, Panacea Lapsorum, Ptarmica Montana, Caltha Alpina, Calendula Alpina, Narda Celtica altera, Doronicum plantaginis folio, Leopard's Bane.

French.—Arnique, Tabac ou Bétoine des Savoyards, Tabac de Montagne, Doronic d'Allemagne, Tabac des Vosges.

German.—Wohlverlei, Fallkraut.

This plant, which belongs, in the *sexual system*, to the Syngenesia polygamia superflua and to the *natural order* Synanthereæ, is in the secondary list of the Pharmacopœia of the United States, but it is not much used in this country; nor does there appear to be any clear appreciation of the cases for which it is adapted.¹

¹ Wood and Bache, Dispensatory of the United States, Art. Arnica.

Such, too, appears to be the sentiment of the French practitioners. "It may be concluded," say MM. Merat and De Lens,¹ "that we have as yet insufficient data to pronounce positively on the affections in which the arnica can be unequivocally efficacious; we must, consequently, always bear in mind its heating and active qualities when we prescribe it."

In Germany, the flowers and root are much employed in paralysis, as an excitant to the nervous system; and it is chiefly to introduce the volatile oil—the *oleum æthereum florum arnicæ*, (*Germ.* Wohlverleiöl)—to the attention of the profession that we refer to the arnica at all. This oil is obtained from the flowers, and has been much recommended by Schneider in old cases of paralysis, which are the result of the apoplectic condition. He himself often administered it with evident success; the paralytic limbs becoming warmer, more active, and more serviceable under its use.

Schneider mixes four drops of arnica oil with half an ounce of the liquor anodynus Hoffmanni, or spiritus nitri dulcis, and of this he gives, for a dose, from four to twelve drops several times a day. The mixture has an agreeable smell and taste. Four drops of the oil to four ounces of sugar form a good *elæosaccharum*.²

ARSENIAS AMMONIÆ.

SYNONYMES. Ammonium Arsenicum, Arseniate of Ammonia.

French. Arséniate d'Ammoniaque.

German. Arseniksaures Ammonium.

This preparation of arsenic has been highly recommended, since the year 1818, by Biett, in several cutaneous diseases, and especially in psoriasis inveterata.³

METHOD OF PREPARING.

It may be prepared by taking of arsenic acid one part, dissolving

¹ Dictionnaire Universel de Matière Médicale, &c. i. 423. Paris, 1829.

² Riecke, Die neuern Arzneimittel, u. s. w. S. 337. Stuttgart, 1837.

³ Cazenave, in Dict. de Médec. 2d édit. iv. 30; and Cazenave's and Schadel's Practical Synopsis of Cutaneous Diseases, translated by R. G. Griffith, M. D. Philadelphia, 1829.

it in water, and adding pure or carbonated ammonia sufficient to saturate the acid ;—or, as follows : Take of white arsenic one part ; nitric acid four parts, and muriatic acid half a part ; saturate the solution with carbonate of ammonia, and let the arsenical salt crystallise.

EFFECTS ON THE ECONOMY IN DISEASE.

A grain of this salt may be dissolved in an ounce of distilled water ; and of the solution from twenty to twenty-five drops be begun with daily, gradually increasing the dose until it reaches a dram or more in the twenty-four hours.

There does not seem to be much difference between the effects of this preparation and those of the other forms of arsenic, that have been received into the Pharmacopœias. The arsenious acid itself, as well as the arsenites of potassa and soda,—the officinal solution of the former well known every where under the name of “Fowler’s Solution ;” that of the latter known, in continental Europe especially, under the name “Aqua Arsenicalis Pearsonii”—are possessed of precisely the same properties as the arseniate of ammonia, and like it have been found equally efficacious in obstinate diseases of the skin. Nor is the knowledge of the agency of arsenical preparations in cutaneous affections new. In India, the efficacy of arsenic in those diseases has been long known ; and, in Europe, attention was attracted to it by Fowler,¹ and Girdlestone,² and subsequently by Willan,³ by Pearson,⁴ and others ; but no one has administered the arsenical preparations more extensively in these diseases than M. Biett, of Paris, whose situation has afforded him ample opportunities for testing the virtues of the different articles of the *Materia Medica* in skin complaints. He has succeeded, by means of the arsenical preparations, and especially of the one we are now considering, in removing several inveterate affections of the skin, that had resisted every other remedy. The author has found equally beneficial results from this practice in his own experience. All chronic cutaneous diseases are dependent upon an alteration in the functions of the capillary vessels or vessels of nutrition of the part affected, and there appear to be

¹ Medical Reports. London, 1786.

² Essays on the Hepatitis, &c. of India. London, 1787.

³ Description and Treatment of Cutaneous Diseases. London, 1798.

⁴ Observations on the effects of various articles of the *Materia Medica* in the Venereal Disease, 2d edit. London, 1807.

but two ways in which those vessels can be reached, so that a new action may be impressed upon them;—in the one case, through the medium of the general circulation; and, in the other, through the agency of topical applications, made to come in contact with the diseased surface. Arsenic, like iodine, mercury in small doses, and other alteratives, acts in the former way—modifying, after a protracted exhibition, the fluid of the circulation in such manner, that it makes an altered impression on the morbid capillaries, and breaks in upon the diseased catenation. In no case, however, have we observed these salutary effects, until the use of the arsenical preparation had been persevered in for several weeks. These diseases are chronic in their nature, and they require a chronic medication. Time is, indeed, in every case, an element in the cure.

ARSENICUM IODATUM.

SYNONYMES. Ioduretum seu Iodidum Arsenici, Iodide of Arsenic.

German. Iodarsenik, Arsenikiodüre, Iodarsen.

Of late this preparation has been highly extolled by Biett, in the same class of affections as the last;—applied externally.

METHOD OF PREPARING.

The iodide is prepared, according to Magendie,¹ in two ways: 1. By heating in a glass alembic, a mixture of sixteen parts of arsenic and one hundred parts of iodine. The combination sublimes in the form of orange coloured needles. 2. Thirty parts of pulverised arsenic, and one hundred parts of iodine are boiled in one thousand parts of water. As soon as the liquid becomes colourless, it is filtered, and the filtered solution is evaporated to dryness. If it be thought advisable, this can be sublimed.

EFFECTS ON THE ECONOMY.

When iodide of arsenic is injected into the veins it does not exert so strong an action on the heart as might be expected from

¹ Formulaire, edit. cit.

so poisonous a substance. Mr. Blake¹ twice injected solutions, containing each six grains of this substance, into the jugular vein of a dog, without producing the slightest appreciable effect on the heart. On injecting a solution, containing fifteen grains, the action of the heart was immediately arrested.

MODE OF ADMINISTERING.

Biett has frequently applied the following ointment in cases of phagedenic tuberculous herpes.

℞. Arsenic. iodat. gr. iij.
 Axung. ℥j.
 M. exactè, ut fiat unguentum.

Cazenave gives, as the usual proportion for an ointment, one part of the iodide to eighteen of lard.

Professor A. T. Thomson has employed the iodide in several cases of lepra and impetigo, with very great success.² He begins with tenth of a grain doses three times a day, and increases them to a quarter of a grain. In some cases, he had not been able to exceed two-thirds of a grain, as symptoms of poisoning came on, and the medicine had to be given in diminished doses.

ARTEMISIA VULGARIS (RADIX.)

SYNONYMES.—Mugwort.

French. Armoise Commune.

German. Beifusswurzel, Gemeiner Beifusswurzel.

Almost all the species belonging to the genus *artemisia* are possessed of bitter and aromatic properties, and several afford the "wormseed." The *artemisia vulgaris* was employed by many of the older physicians, but it had fallen into oblivion, when its use was revived in Germany, by Burdach, a physician at Triebel, near Sorace,³ who recommended it strongly as a preventive of epilepsy.

¹ Edinburgh Medical and Surgical Journal, April, 1839, p. 336.

² Lancet, Jan. 19, 1839, p. 621.

³ Hufeland's Journal, B. lviii. St. 4 und 5.

Since that time, it has been much prescribed in that country, but its employment has not extended much to other countries of Europe, or to this side of the Atlantic. The root is the part preferred;—formerly the herb and the tops were solely used.

The root was employed in epilepsy, centuries ago, but it had been neglected, or was only exhibited as a nostrum, when Burdach entered upon his investigations, of which the following is a summary.

The root of the *artemisia* should be dug up in autumn, after the stalk has become dry, or in the spring before the stalk has shot up; but perhaps the latter half of November is as good a period as any. It must be freed from the adherent earth by shaking. Burdach regards washing it to be objectionable, as the root may lose some portion of its efficacy thereby. The old, ligneous, mouldy, and damaged parts of each root must be carefully removed, and the fresh young side roots (*fibrillæ*), which are distinguished by their smell, clear colour, and greater juiciness, must be spread on paper, and dried in the shade, and as soon as they become brittle they must be carefully preserved. Besides the *fibrillæ*, the soft, sound, and juicy parts of the root, especially the fleshy rind of the thicker roots, must be used.

The period required for drying them varies; in moist weather it may require two months; but late in the year the desiccation may be aided by the gentle warmth of the sun, or of a stove; the latter must never, however, rise higher than from sixty-four to sixty-eight degrees of Fahrenheit. If put away too early the root becomes spoiled; if, too late, it loses many of its volatile parts. When powdered, it ought not to be kept too long, as the volatile portions escape and it soon becomes devoid of smell. Even during the process of pulverising loss is sustained, and the fresh powder has a much feebler odour than the entire root, so that Burdach advises for distant patients, that the root in substance should be sent to them, and that they should be recommended to pound it for use in a well covered mortar. By pulverising, the inner, hard, woody parts are separated from the smaller roots; they must be removed and thrown away, as the powder of the cortical substance of the small radicles has alone been found efficacious. The smell of the well dried root is very strong, pungent and peculiar, especially when we open a vessel in which it has been stored away in quantity. The taste is sweetish, sharp and nauseous.

EFFECTS ON THE ECONOMY IN DISEASE.

It has been already remarked, that Burdach¹ recommends the artemisia especially in epilepsy; and he affirms that it requires no preparation or special attention.

It is most efficacious when given about half an hour before the attack, which it usually prevents; but if this be impracticable, it may be given as soon as the patient comes to. The dose is a heaped up tea-spoonful, (from fifty to seventy grains,) which may be administered in warm beer; the patient should be put to bed immediately, covered up warm, and allowed warm small beer to drink, so as to occasion diaphoresis—care being taken that he does not expose himself to cold. This course is to be repeated so long as there are any traces of mischief. When the remedy, however, acts favourably, Burdach asserts, that frequent repetition is not often necessary. At times, it happens, that when the dose has been raised to a dram and a half, and thrice repeated, no critical sweat follows, Burdach then aids the operation by giving the liquor cornu cervi succinatus, (*spiritus ammoniæ succinatus*), in an infusion of serpentaria, valerian root and arnica flowers; but the effect, he says, was always better when the diaphoresis was produced by the artemisia alone. One important advantage in the use of this agent is, that a judgment can be speedily formed of its utility; when much may be expected from it, a marked improvement usually occurs after the first doses. In those cases of epilepsy which recur every day, and sometimes even from three to fifteen times a day, and especially where the paroxysms are so violent and frequent, as to leave little interval for the patient to be restored to consciousness, the artemisia has proved more certain in its operation, either by removing or mitigating the disease. In such cases, two doses were given on the first day, and afterwards one tolerably strong dose daily till the third day. In those forms of epilepsy, whose attacks recurred twice daily, morning and evening, the artemisia acted very beneficially; the paroxysms soon became somewhat weaker, shorter, and were postponed a day or two. In such cases, it is advisable to continue the remedy for some weeks. Infants at the breast bear the artemisia especially well. It is equally efficacious in the epileptic attacks of young females from twelve to fifteen years of age, and prior to the establishment of menstruation.

¹ Casper's Wochenschrift, Oct. 22, 1836, S. 675.

Under its use, the catamenia have generally taken place, and the epilepsy has disappeared. On the other hand, the artemisia was found to aggravate cases of epilepsy occurring as a disease of growth, (*Entwickelungskrankheit*,) in young persons from seventeen to twenty-two years old, and as a consequence of great corporeal development. It was equally unfortunate in cases of *epilepsia nocturna*, where the paroxysms came on irregularly at an interval of about five, ten, or fifteen days, and generally about midnight; as well as in that form in which, after the patient had suffered for six, seven or eight weeks, under violent symptomatic sweats, a morbid condition ensued from two to three times every twenty-four hours, consisting of repeated epileptic attacks, with great prostration in the intervals.

These are the main results of the communications of Burdach on this subject.¹ The number of his experiments and observations was considerable, and the results appear to have been frequently most happy, especially in the case of females, who seem to have exhibited themselves more beneficially impressed by the remedy than males; the proportion of cures being as three to two. Tosetti² gives the proportion of cases in women and children to that in men, as eight to six.

In the Berlin Charité, the artemisia is said to have been used with equal success. The German journals contain numerous cases, on the authority of E. Gräfe,³ Wagner,⁴ Van Maanen,⁵ Wolf,⁶ Osann, Bonorden,⁷ Schlüter, Bird,⁸ Löwenhard,⁹ Geis,¹⁰ and others.¹¹ But few physicians, according to Riecke, have been disappointed in it, and where they have been, he ascribes the failure to its having been given in cases for which it was inappropriate, or to the preparation of the artemisia not having been properly attended to.¹²

¹ Riecke, *Die neuern Arzneimittel*, u. s. w. S. 49. Stuttgart, 1837.

² *Diss. inaug. de radicè Artemis. vulg. remed. antiepilept.* Berolin, 1827; and Osann in *Art. Artemisia*, *Encyc. Wörterb.* iii. 313. Berlin, 1829.

³ Gräfe und Walther's *Journal*, B. vi. H. 2.

⁴ Hufeland's *Journal*, lix. S. 6.

⁵ *Ibid.* lxi. 5.

⁶ *Ibid.* lxii. 3.

⁷ *Ibid.* lx. 1.

⁸ *Ibid.* lxv. 3.

⁹ *Ibid.* lxv. 3.

¹⁰ *Ibid.* lxv. 3.

¹¹ Richter's *Specielle Therapie*. B. x. S. 377. Berlin, 1828.

¹² *Op. cit.* S. 49.

In consequence of a German physician having recommended the *Artemisia absinthium* to Professor A. T. Thomson, Professor Elliotson¹ was induced to try it in epilepsy. The patient to whom he gave the medicine was a girl, seventeen years of age, who had been affected with epileptic fits for four months—three or four occurring daily. A dram of the powder of the artemisia was given three times a day. This was on the 30th of March. On the 9th of April, the dose was increased to two drams, when the fits became less frequent, but not less severe. On the 16th, the dose was repeated every four hours. She had only one slight fit in the course of twelve days; and on her dismissal, on the 24th of May, she had had no fit for twenty-six days. Dr. Elliotson was of opinion, that the strong infusion would be less offensive to the patient, and quite as effective as the powder.

Besides epilepsy, the artemisia has been used with advantage in other diseases, as in St. Vitus's dance.² Wutzer employed it successfully in the convulsive diseases of childhood, and it is recommended by Biermann³ in eclampsia infantum, occurring during the period of dentition. He recommends it to be given to children in gradually increasing doses, commencing with half a grain; and, an hour afterwards, giving a grain, and in two hours, two grains, which is usually the last dose required. The gradual augmentation of the dose he considers advisable, "to prevent the crisis which the artemisia induces, from being too turbulent," (stürmisch.)

Kölreuter, of Carlsruhe, administered the artemisia in different diseases with great success. He prefers the *extractum resinosum radicis artemisiæ vulgaris* to the root in substance. This is prepared in the following manner.

A quantity of the dried and powdered root is covered with highly rectified spirit of wine, and permitted to digest for some time: the filtered liquor is then evaporated, in an earthenware vessel, until it has attained the consistence of an extract.

Kölreuter employed this advantageously in the eclampsia of children, (in certain cases after the application of leeches;) in tormina unaccompanied by inflammation; in the diarrhœa of children and adults; in sporadic cases of cholera morbus, and in

¹ Lancet, July 9, 1836.

² Gittermann in Hufeland's Journal, lxii. 1. Bonorden, Op. cit.

³ Riecke, Op. cit. S. 50.

dysentery, after the bloody evacuations had ceased; in gastric fevers on their assuming a nervous character, and in dysphagia, cardialgia, chronic vomiting, scirrhus of the stomach, chronic cephalalgia and neuralgia of the-face; in chlorosis, and in obstruction of the catamenia, as well as in epilepsy. The dose in the twenty-four hours from ℥ss. to ℥j.; to small children, a few grains.

Such is the chief testimony adduced in favour of the artemisia by the German writers mainly. It is to be feared, that the advantages to be derived from it in epilepsy have been exaggerated. Where there is no organic disease of the encephalon, substances, which, like the artemisia, are nauseous, bitter and aromatic, may be productive of advantage in the way of tonics and revellents. In one case of this nature it was employed by the author, but the results were not striking. When aided by other means and appliances it appears likewise to be powerfully diaphoretic, and doubtless, therefore, in appropriate cases—especially where there is much nervous impressibility—it may be productive of the good effects ascribed to it by Burdach, Kölreuter and others. Yet—as Osann has remarked¹—it must be improper where polyæmia, or a tendency to active congestion or hyperæmia is present. The analysis of Hergt, Hummel, and Jänike afforded, along with traces of volatile oil, some balsamic resin, both of which are excitants to the living economy.

MODE OF ADMINISTERING.

The following forms for its administration have been adopted by some of the German authorities.

Decoctum Artemisiæ.

Decoction of Mugwort.

- ℞. Rad. artemis. vulg. concis. ℥j.
Coque cum aquæ fontanæ q. s. per semihoram
ad. colat. ℔j.

Half a tea-cupful of this may be taken every two hours in cases of epilepsy.

HILDENBRAND.

¹ Art. Artemisia, in Encyc. Wörterb. iii, 313. Berlin, 1829.

Pulvis Artemisiæ.

Powder of Mugwort.

- ℞. Rad. artemis. vulg. in pulvere, ʒj.
Sacch. alb. ʒj. M. et fiat pulvis.

The powder to be administered daily in the evening, in warm beer, in cases of epilepsy.

LOEWENSTEIN.

Mistura Artemisiæ.

Mixture of Mugwort.

- ℞. Ext. resin. artemis. vulg. gr. iv.
Gum. arab. ʒj.
Sacch. alb. ʒiij.
Emuls. amygd. ʒiij. M.

A coffee-spoonful¹ to be given every half hour in eclampsia infantum. The dose may be gradually raised to two coffee-spoonfuls.

KOELREUTER.

ASPARAGI OFFICINALIS TURIONES.

SYNONYMES. Asparagus Shoots.

German.—Spargelnsprossen.

The diuretic effect of the common asparagus is well known, and has given occasion to its admission into many of the pharmacopœias of continental Europe—into those of Amsterdam, Anvers, Brunswick, Spain, Paris, Ferrara, Geneva, and Wirtemberg, for example. Within the last few years, the young shoots have been introduced by the French practitioners, and hitherto they have been mainly administered in one form only—that of syrup.

The *Syrup of asparagus*, (syrupus asparagi. *French*—Syrop des Pointes d'Asperge. *German*—Spargelsyrup,) is commonly prepared according to the following formula.

A quantity of fresh asparagus is taken—Chevallier says only the upper green heads or tops of the young shoots—these are bruised in a marble mortar, after which the juice is expressed and heated in a water bath, until the albumen is coagulated: it is then filtered

¹ About two ordinary tea-spoonfuls.

through paper, and to every pound of the juice thirty ounces of white sugar are added. It is then passed through flannel.¹

This syrup has been recently recommended as a sedative in palpitation of the heart, and as an agent that might be advantageously substituted for digitalis. According to Richard and Soubeiran, however, the syrup never diminishes the number of pulsations as the digitalis commonly does. Other French physicians² regard it as a general sedative agent, and affirm, that they have employed it advantageously for the relief of neuralgia, and even of such pains as are caused by organic disease, as well as in violent coughs, &c.

Some have esteemed it an antidote to coffee, in preventing the sleeplessness which it occasions.³

The common dose of the syrup is two, four to six spoonfuls in the course of the day.

Riecke⁴ says, the Medicinalrath Heyfelder informed him, that he had employed the syrup of asparagus with good effect in diseases of the heart, according to Gendrin's recommendation, and especially in hypertrophy of that organ. He found it, moreover, worthy of recommendation in dropsy, crusta lactea, and in other cutaneous affections, when mixed with the ordinary drink; but it is probable that the good effect in these skin diseases was owing to the sugar—little, if any, perhaps, being ascribable to the asparagus.

An *extract of asparagus* has been recommended recently. It is made by macerating the inner, white, strongly odorous portion of the sound, not ligneous, two to three years old, roots in cold water: like the syrupus asparagi it is said to retard the circulation of the blood, and to dispose to sleep. On account of its disagreeable taste, it is given in the form of pill.

The dose is from ʒss. to ʒij. in the 24 hours.

¹ See on the preparation of this syrup, MM. Latour de Trie, and Roziers, in *Journal de Pharmacie*, Dec. 1833, and *Philad. Journal of Pharmacy*, vi. 122. *Philad.* 1833-4.

² Eusèbe de Salle, in *Gazette Médicale*, Mai 28, 1831, and Gendrin, in *Gazette Médicale de Paris*, Juin, 1833.

³ Riecke, *Op. cit.* S. 53.

⁴ *Op. cit.* S. 440.

AURI PRÆPARATA.

SYNONYMES. Preparations of Gold.

French.—Les préparations d'Or.

German.—Goldpräparate.

The administration of gold in medicine is not modern. In the times of alchemy, it was frequently used in nervous diseases, convulsions, hypochondriasis, mental affections, profuse salivation, &c. Paracelsus, Horst, and Poterius recommended it, united with corrosive sublimate, in syphilis. Its violent effects, however, brought it into discredit, and during the decadency of alchemy it fell into entire disuse.¹ It is probable, too, that many preparations were brought forward as containing gold, which had none of it, and this may partly account for the discredit into which it lapsed.²

M. J. A. Chrestien³ was the first who—in more modern periods—(about the year 1810) recalled the attention of practitioners to the use of the preparations of gold, and after him many physicians employed them, so that the published results of their observations have furnished us with a considerable amount of evidence in relation to the therapeutical properties of those preparations, and they have in consequence, been received into many of the modern pharmacopœias.⁴

As the different preparations agree in their effects on the economy, it may be well to make a few observations which apply to all.

EFFECTS ON THE ECONOMY IN HEALTH.

Orfila made many experiments to discover the action of the preparations of gold on animals. Three dogs, into whose jugular veins he injected a small quantity of the muriate of gold dissolved in water, died speedily—death being preceded by difficulty and rattling in breathing, cough, symptoms of suffocation and slight

¹ Richter's *Specielle Therapie*, x. 504, Berlin, 1823; and Nacet, *Art. Or*, in *Dict. des Sciences Médicales*, tom. xxxvii.

² Riecke, *Die neuern Arzneimittel*, S. 53. Stuttgart, 1837.

³ *Recherches et observations sur les effets des préparations d'Or* du Dr. Chrestien, &c. Paris, 1821.

⁴ See *Art. Gold*, in *Encycl. Wörterb. der medicinisch. Wissenschaft*. B. xv. S. 77. Berlin, 1837.

vomiting; these results supervening immediately after the injection had entered the blood vessels.

On dissection the lungs were found livid, engorged with blood, and without any crepitating noise when cut into; wrinkled, discoloured, and scarcely lighter than water; the heart was of a violet colour; the left auricle and ventricle full of black blood, and the right cavities empty and contracted. The effect of the salt supervened with such rapidity, that the blood of the crural artery—which was opened a few minutes after death—was of a brownish red, almost black, colour. In two dogs, to which he gave the muriate of gold, a torpid condition was induced, which terminated fatally in a couple of days. The mucous membrane of the stomach was found inflamed and ulcerated.

The effects on man of agents, so potent in appropriate doses, have been investigated by many observers. Experiments on animals had already exhibited the powerful influence, which they are capable of exerting on the organs and functions of organic life. One of the most prominent effects appears to be, an increase of the various secretions; commonly, the urinary secretion is largely augmented, as well as the transpiration, and the intestinal and salivary secretions. Not unfrequently, under the continued administration of the gold, actual salivation ensues, which differs, however, from that induced by mercury. It is always slow in appearing, and is by no means so exhausting as that caused by mercury; nor do troublesome ulcers occur; whilst the saliva is thinner, and not so tenacious. Like mercury, the preparations of gold occasion excitement in the organism, which often ends in a true febrile condition: after they have been taken for some time in moderate doses, there is generally a feeling of increased warmth in the stomach, and an augmentation of the appetite. The pulse is rendered fuller and more active, and the animal heat and vital activity are augmented, so that in such as are predisposed to the affection, hemorrhage is apt to take place. The catamenia recur sooner than usual under their influence, and the quantity lost may be greater.¹ Sooner or later, a regular attack of fever not unfrequently supervenes,—as indicated by shivering pains in the limbs, back, and stomach, which may continue for a few hours, but sometimes lasts for days, and at length ends by sweating, depositions in the urine, and occasionally by salivation.

¹ Riecke, *Op. cit.* S. 55.

In very large doses, the preparations of gold are corrosive poisons. The symptoms, caused by their use, when they act as such, are—oppression in the region of the stomach, nausea, vomiting, pains in the abdomen and diaphragm, a metallic taste in the mouth, augmented secretion of saliva, without the teeth or gums being affected, pulse excited and breathing oppressed.¹ As a general rule, they are not esteemed proper for impressible individuals; on the other hand, in persons of torpid constitutions they would appear to have exerted an excitant influence even on the generative system. Certain persons, according to Chrestien and Niel, are not susceptible of this action; and again there are some, according to Cullerier, Junr., who cannot tolerate them in any form.

When too large a dose has been given, the remedy should be entirely discontinued for some time, or the dose be diminished; the effects will soon disappear. One of the greatest recommendations of gold over mercury, in the eyes of many, is, that it does not act so destructively on the organism, and never induces such a cachectic condition as the latter occasionally does.²

EFFECTS ON THE ECONOMY IN DISEASE.

The diseases, in which the preparations of gold have been administered, in modern times, are chiefly the following.

1. *Syphilis*.—They have been occasionally used in primary sores, but have been mainly employed in secondary syphilis, especially in old cases, where a doubt often exists, whether there is more of mercurial cachexia or of syphilis in the case. They are given, also, where there is a scrofulous complication, and where it is desirable to exhibit some other remedy than mercury; and lastly, their use is indicated where mercury has failed in removing syphilis.³ Many practitioners doubt whether the preparations of gold should be esteemed much inferior to those of mercury. Numerous experiments, instituted, amongst others, by Chrestien,⁴ Cullerier, junr.,⁵ S. L. Mitchell,⁶ Niel, Bielt, Lallemand,⁷ Wendt,⁸

¹ Grötzner, in Rust's Magazin, xxi, 3.

² Riecke, Op. cit. S. 56.

³ Eberle, Treatise on the Mat. Medica, 2d edit. i, 247.

⁴ Op. citat. S. 6.; see, also, Lettre à M. Magendie sur les préparations d'Or, &c. Paris, 1828.

⁵ Dict. des Sciences Médicales, Art. Or. Tom. xxxvii.

⁶ Dyckman's Dispensatory, p. 201, and Eberle, Op. cit.

⁷ Journal Universel des Sciences Médicales, t. xxvii.

⁸ Rust's Magazin, Bd. xvi, St. 1.

and Legrand,¹ have shown, that their employment has been most advantageous in the different forms of syphilis, and that they have rarely disappointed expectation. Alibert found them especially useful in syphilitic eruptions. It must be borne in mind, however, that when they are given in syphilis, their operation is slow, and that, in the first instance, the symptoms may appear aggravated; they are not, therefore, adapted for cases in which it is important to act speedily, so as to arrest the disease at once, and prevent its farther development.

2. *Gonorrhœa*. In protracted cases of gonorrhœa, several physicians² have extolled the preparations of gold; others, as Wendt and Ritter, have advised them for the sequelæ of gonorrhœa (*Trip-pernachkrankheiten*): it is not probable, however, that they could be of much use in gonorrheal affections, which, as is well known, are curable without any mercurial preparations.

3. *Scrofula*. The efficacy of the preparations of gold in scrofula, was deposed to by Chrestien, Eberle, Niel, Legrand,³ Herrmann, and Kopp.⁴ According to observation, it would appear that it effects improvement in the mildest cases, and is beneficial where there is much torpor, but that it ought to be avoided in irritable subjects. In scrofulous ophthalmia, and in scrofulous porrigo, it would seem to have been most efficacious.

Recently, the preparations of gold have been employed by M. Baudelocque at the *Hôpital des Enfants Malades*, and by M. Velpeau at La Charité.⁵ At the former institution, they were given in enormous doses. M. Baudelocque gave the hydrochlorate and the stannate in doses of from ten to twelve grains, without producing any effect on the disease, and without any apparent injury to the constitution of the children subjected to the experiment. The oxide of gold prepared by potassa was carried as high as twenty grains during the day. At La Charité, Velpeau gave fifteen, eighteen, and twenty grains of the hydrochlorate and oxide of gold during the day, and higher doses were not tried, solely on account of the expense of the medicine. These results are strongly discordant from those of Orfila and Devergie, the former of whom affirms that the hydrochlorate of gold is more active than the corrosive sublimate, and the latter states, that in the dose of one

¹ Gazette Médicale de Paris, Oct. 30, 1837.

² Grötzner, Op. cit.

³ Bulletin Générale de Thérapeutique, No. xv, Août. 15, 1837.

⁴ Denkwürdigk. in der ärztl. Praxis, iii. 351.

⁵ L'Expérience, No. lxxxvii.; and Lancet, March 23, 1839, p. 31.

tenth to one twentieth of a grain, it produces more or less inflammation of the lining membrane of the stomach and intestines.

4. *Scirrhus and cancer.* The utility of the preparations of gold appears to have been most decided in scirrhus induration of the tongue, according to the observation of Wendt, Helm, and others; in such case, they are rubbed on the tongue; this, indeed, is the most common form of administration. H. Hoffmann relates a case of scirrhus of the pylorus, in which the muriate of gold was entirely successful; and frictions with the muriate, or the oxide of gold on the labia pudendi have been recommended by Hufeland, Herrmann, Meissner, Grötzner, Gozzi,¹ and others, in cases of scirrhus and cancer of the uterus. In the same affections, Krimer has advised them to be applied to the os uteri. Scirrhusities, it is affirmed, have been dispersed through their agency; and even in open cancer marked improvement has been perceptible.

5. In *tumors of the bones*, and in like affections, the preparations of gold have been employed successfully by some practitioners, and especially when the cases originated in syphilis.

7. Several forms of *lepra* have been treated with them by Alibert, and A. T. Chrestien, and with the best effects.

Lastly. Wendt, Delafield, and Grötzner have administered them with benefit as diuretics in dropsy. With others, however, they have failed. According to Riecke,² the results of experience would seem to show, that they are especially adapted for dropsy, dependent upon organic disease of some viscus.

None of the preparations of gold are much employed at the present day. Their expense is, indeed, a weighty objection—unless there were striking advantages in adopting them in special cases of disease in preference to other articles of the *Materia Medica*.

I. AURI CYANIDUM.

SYNONYMES. A. Cyanuretum, Cyanuret, Cyanide or Tercyanide of Gold.

French. Cyanure d'Or.

The mode of preparing this combination recommended by M. O. Figuier,³ of Montpellier, is as follows. He decomposes the

¹ Sopra l'uso di alcuni remedii aurifici nelle malattie venere. Bologn. 1817; and Omodei, Annal. Univers. di Medicin. vol. v.

² Op. cit. S. 58.

³ Journal de Pharmacie, and Amer. Journ. of Pharm. vi. 82. Philad. 1833-4. See, for another mode of preparing it, Deferre, in Bulletin Général de Thérapeutique, Fevrier, 1838.

chloride of gold by the cyanuret of potassium, but he states that many precautions are necessary to procure it in a pure state. The chloride must be as neutral as possible, which can only be done by recrystallising the salt several times. The cyanide must not be alkaline, or contain any formiate or carbonate of potassa. This salt is to be added to the solution of the chloride of gold very cautiously as long as there is any precipitate, taking care that there is not the slightest excess of the cyanide, as this would cause a solution of part of the product, and the formation of soluble double cyanides. The cyanide, thus made, is to be well washed with pure water, and dried in a dark place.

In some recent experiments Magendie¹ found that the cyanide is one of the substances that promote the coagulation of the blood. Where, consequently, it is desirable to impress a modification on that fluid in chronic cutaneous and other affections, its administration might perhaps be found useful.

M. Pourché, who has used it successfully in syphilis and scrofula, recommends its administration in the form of frictions on the tongue, mixed with powdered orris root, well washed in alcohol, and dried.

℞. Auri cyanuret. gr. j.
Pulv. irid. florent. gr. iij. M.

In pills he prescribes it as follows:—

℞. Auri cyanuret. gr. j.
Ext. mezereon. gr. iij.
Pulv. althææ q. s. ut fiat massa.

Each pill to weigh five grains.

In children, the dose at first should never exceed one fifteenth of a grain.

II. AURI IODIDUM.

SYNONYMES. Iodide of Gold.

French. Proto-Iodure d'Or.

According to the French Codex, this is made by adding a solution of pure cyanide of potassium to a solution of chloride of gold, collecting the iodide of gold, which falls down, on a filter, and

¹ *Leçons sur le Sang, &c.*; and Translation, in *Lancet*, January 20, 1839, p. 636.

washing it with alcohol to remove the excess of iodine, which precipitates with it. This has been used in the same cases as the other preparations of gold, in the dose of one fifteenth to one tenth of a grain.

III. AURUM METALLICUM.

SYNONYMES. Metallic Gold.

French. Or Métallique.

German. Metallisches Gold.

Metallic gold is either administered in the form of the *aurum limatum*, or gold filings—formed by filing the finest gold with a fine toothed file—or in that of the *pulvis auri*, (Fr. *Or divisé*—Germ. *Goldpulver*,) which is obtained by amalgamating gold with quicksilver, and driving off the quicksilver by heat.¹ According to Trommsdorf, a very fine gold powder may likewise be obtained by precipitating the gold from a dilute solution of the metal in nitro-muriatic acid, by means of green sulphate of iron. The precipitate, thus formed, when washed and dried, is of a brownish colour, but when polished exhibits the most beautiful golden splendour.²

Chrestien and Niel have exhibited metallic gold largely, and they affirm successfully; but, according to Wendt, it has no action on the economy. It is not easy, indeed, for us to conceive, that a substance so difficult of oxidation can have much, if any, effect. The former gentleman and Gozzi, regard it as the mildest of the preparations of gold, but as equally efficacious with the others, although more tardy in producing its effects.

Metallic gold has been administered in the dose of from a quarter of a grain to a grain, three or four times a day, in the form of powder or pill; the dose being gradually increased: or it has been rubbed daily upon the tongue, in the quantity of from one to three grains mixed with starch powder, or the powder of the lycopodium. Where the condition of the tongue and of the interior of the mouth does not admit of this, Niel advises that a blister should be applied on the side of the neck, and that the denuded surface should be dressed with a mixture of a grain of gold amalgamated with mercury, and half a dram of lard: gradually augmenting the quantity of gold to two grains. In syphilitic ulcers and excoriations,

¹ Jourdan's *Pharmacopée Universelle*, ii. 215. Paris, 1828.

² Riecke, *Die neuern Arzneimit.* S. 58. Stuttgart, 1837.

metallic gold is applied externally, amalgamated with the proper quantity of mercury, and united with unsalted butter, lard, or cerate, in the proportion of twelve grains to one ounce. In syphilitic excrescences, frictions with gold powder, mixed with the saliva, are said to have been serviceable.

The following formulæ are given by Riecke.¹

℞. Pulver. auri, gr. vj.
Amyli. gr. lxxvj.
M. F. pulv. in part. xij æquales divid.

A powder to be given four times a day.

℞. Pulver. auri.
Sem. lycopod. aa. gr. ij.
M. F. pulvis.

A powder to be rubbed once a day upon the tongue.

IV. AURUM MURIATICUM.

SYNONYMES. Aurum Chloratum, Chloretum Auri, Murias Auri, A. Oxydulatum Muriaticum, Aurum Salitum, Chloruretum Auri, Chloridum Auri, Auri Terchloridum, Muriate of Gold, Chloride of Gold, &c.

French. Chlorure d'Or, Muriate d'Or.

German. Salzsaueres Gold, Chlorgold, Goldchlorid, Salzsauere Goldoxydül.

This preparation is received into several of the European Pharmacopœias, and is usually formed by digesting one part of gold leaf in three parts of the nitro-muriatic acid in a sand bath, and evaporating gently to dryness. Magendie,² however, recommends the following method.

Take one part of fine leaf gold, divide it into small portions, and put it into a vial of white glass, pour upon it three parts of aqua regia—formed of one part of nitric acid and two parts of muriatic acid—and heat the whole in a small sand bath, so arranged, that in case the retort breaks the fluid may be recovered without loss. The solution of the gold will soon take place. The fluid must then be evaporated until the smell of chlorine is perceptible. This point can be readily determined, as after the decomposition of the aqua regia there is a period during which the nitrous acid is alone given off. The disengagement of the chlorine indicates the com-

¹ Riecke, Die neuern Arzneimit. S. 59. Stuttgart, 1837.

² Formulaire.

mencement of the decomposition of the chloride formed. The vessel must now be removed from the fire and suffered to cool. The chloride appears immediately as a crystalline mass, in the form of a multitude of beautiful yellow needles. In this condition, the chloride of gold is as pure as it need be: it contains no excess of muriatic acid, and is not deliquescent.

It can be preserved in the same vessel in which it has been prepared—by merely stopping it with paper—without any danger of its undergoing decomposition.

Wendt directs it to be formed in the following manner :

℞. Auri puri quantum placet,
Solve in

Acid. nitric. part. j,
— muriat. pur. part. iij,

Deinde leni calore evapora ad siccum in vase vitreo. Massam remanentem saturatam dissolve in aq. distill., solutam filtra et ad crystallisandum sepone. Crystallos collectos tere in mortario porcellaneo supra arenam calidam ad siccum. Sal concretum statim, ne humidi quid attrahat, in vitro obturato serva.¹

Muriate of gold, prepared according to Magendie's formula, is very acid, but this property is not owing to its containing any free acid. The taste is also styptic and disagreeable. It only attracts moisture from the air when it contains an excess of muriatic acid, as is the case in Wendt's preparation. It is readily soluble in water with which it forms a solution of a beautiful yellow colour.

Many animal and vegetable substances, and especially the epidermis, are coloured by it of a purple violet when it is placed in contact with them. Exposed to a moderate heat, it passes to the state of protochloride. When heated to a greater degree, in close vessels, chlorine is disengaged and metallic gold left behind.

Wendt's preparation, when dissolved, is very easily decomposed, and it has therefore to be kept from the influence of light and air.

The chloride is one of the most active of the preparations of

¹ Take of pure gold at pleasure,
Dissolve in

Nitric acid, one part,
Muriatic acid, three parts,

Then evaporate with a gentle heat to dryness in a glass vessel. Dissolve the saturated remaining mass in distilled water, filter the solution and set it aside to crystallise. Rub the collected crystals in a porcelain mortar over warm sand to dryness. Keep the concrete salt in a well stopped glass vessel to prevent it from attracting moisture.

gold. It belongs to the class of corrosive poisons,¹ and greatly resembles corrosive sublimate in its operation on the economy. It must consequently be administered with caution—even a tenth of a grain has been known to induce unpleasant irritation of the stomach.² It has been given both internally and externally in syphilis, dropsy,³ and glandular affections.

The dose is from one sixteenth to one twelfth of a grain once or twice a day, being gradually but slowly increased. In the like quantity it has been rubbed upon the tongue and gums. Externally it has been applied in the form of ointment or watery solution—the last more particularly in ophthalmia, especially of the scrofulous kind, in which Jahn found it very efficacious.

The following are some of the forms in which it has been prescribed.

Boli Antisyphilitici (Pharmacopœia Batava.)

Antisyphilitic Boluses.

- ℞. Chloruret. auri, gr. ss ad gr. ij.
Extract. aconit. gr. vj ad gr. xij. Fiant boli sex.

Two of these to be taken for a dose, and repeated three times a day.

Pilulæ Chlorureti Auri, (Ph. Amstelodamensis nova.)

Pills of Chloride of Gold.

- ℞. Chloruret. auri, gr. x.
Pulv. rad. glycyrrhiz. ℥iij.
Syrup. q. s. ut fiant pilulæ cl.

Dose.—One daily, gradually augmenting the quantity.

- ℞. Auri muriatic. gr. i.
Pulv. lycopod. gr. xv. M. fiat pulv. in part. xvi dividend.

One of the powders to be rubbed upon the tongue and gums daily.

CHRESTIEN.

Gradually, the same quantity of the muriate may be divided into twelve and ten parts, and used in the same way.

¹ Orfila, Toxicolog. i, 593.

² Magendie, Formulaire.

³ Wendt, in Rust's Magazin, B. xxv.

Unguentum Auri Muriatici.

Ointment of Chloride of Gold.

℞. Auri muriatic. gr. iv.

Misce intimè cum

Ung. rosat. ℥j.

WENDT.

Collyrium Auri Muriatici.

Collyrium of Chloride of Gold.

℞. Auri muriat. gr. ij.

Solve in aquæ distill. ℥vj.

F. collyrium.

To be applied by means of linen compresses, or dropped into the eye.

JAHN.

V. AURUM MURIATICUM NATRONATUM.

SYNONYMES.—Aurum Muriaticum (Pharmac. Borussic.), Aurum Chloratum Natronatum, Sodii Auro-Terchloridum, Perchloruretum Auri et Sodii, Chloretum Auri cum Chloreto Natrii, Murias Aurico-natricum, Chloruretum Auri et Sodii, Chloride of Gold and Sodium, Hydrochlorate or Muriate of Gold and Soda, Auro-terchloride of Sodium.

French.—Hydrochlorate ou Muriate d'Or et de Soude.

German.—Salzsaures Goldnatrum, Chlorgoldnatronium, Goldnatrium-chlorid.

This preparation is in the Pharmacopœias of Prussia, Ferrara, Sweden, &c.

Figuier directs it to be prepared in the following manner.¹ Dissolve four parts of gold in aqua regia, and evaporate the solution to dryness; add thirty-two parts of water, and one part of chloride of sodium, and evaporate to one half. On cooling, crystals will form, which consist of 69.3 parts of chloride of gold; 14.1 parts of chloride of sodium, and 16.6 of water.

The formula of the Prussian Pharmacopœia is as follows:—

℞. Auri, partes vj.

Solve in

Acidi muriatici, q. s.

¹ Annales de Chimie, Février, 1822, and Riecke, Die neuern Arzneimittel, S. 63, Stuttgart, 1837.

Acidi nitrici quantum ad auri solutionem requiritur, guttatim addendo.
Tunc admisce

Natri muriatici sicc. part. x.

Et post solutionem leni igne evaporando
in pulverem flavum redige.¹

This preparation has a beautiful yellow colour, and appears under the form of four-sided prisms. It attracts moisture from the air, but to a less degree than the chloride of gold with excess of sulphuric acid.

The Aurum Muriaticum Natronatum of the Germans is milder than the preceding preparation, and is more frequently administered, especially in Germany, than any of the preparations of gold. It is used both internally and externally.

The dose is about the same as that of the last preparation, but it may be carried higher.

Kopp affirms,² that he has frequently employed this preparation with advantage in scrofulous tumefaction of the upper lip, when given in small doses. He prescribed daily, and once or twice a day, from one thirtieth to one twenty-fourth of a grain of the aurum muriaticum natronatum, reduced to powder with two grains of sugar, and by means of the finger rubbed on the inner side of the affected lip. In adults with scrofulous, thick, sensible, and slightly inflamed nose, Riecke³ recommends the ointment given below to be applied to the nasal fossæ, and three times a day a powder composed of from one sixteenth to one twelfth of a grain of the salt of gold to two grains of sugar (Milchzucker), to be rubbed on the gums with the moistened finger. The salts of gold, according to Riecke, appear to have a specific action on the organs in the mouth, on the gums and the nose!

Pulvis Perchlorureti Auri et Sodii.

Powder of Perchloruret of Gold and Sodium.

℞. Auri et sodii perchlorureti, part. iij.

Irid. florent. in pulv. subtil. part. ix.

¹ Take of gold, six parts:

Dissolve in a sufficient quantity of

Muriatic acid, adding as much nitric acid as is required to dissolve the gold. Then mix ten parts of dry muriate of soda; and after evaporating the solution over a slow fire reduce it to a yellow powder.

² Op. cit. B. iii, S. 351.

³ Die neuern Arzneimittel, u. s. w. S. 442.

Three grains of this represent three quarters of a grain of the salt of gold. These three grains are divided into thirty frictions for the weakest doses, and into three for the strongest. Starch may be substituted for the powdered orris root. LEGRAND.

Solutio Auri Muriatici Natronati.

Solution of Muriate of Gold and Soda.

- ℞. Auri muriat. natron. gr. ij.
Aquæ distillat. ℥j. M.

Ten drops to be given every two or three hours, in cases of dropsy. GRÖTZNER.

Pilulæ Auri Muriatici Natronati.

Pills of Muriate of Gold and Soda.

- ℞. Auri muriat. natronat. in aquæ distillat. q. s. solut. gr. iv.
Extract. aconiti, ℥ss.
—— stipit. dulcam. ℥j.
Pulv. rad. althææ, q. s. ut fiant pilulæ Nro. lxxx.

Three pills to be taken three times a day. GRÖTZNER.

Pastilli Auri Muriatici Natronati.

Lozenges of Muriate of Gold and Soda.

- ℞. Auri muriat. natron. gr. v.
Pulv. sacchar. alb. ℥j.

Misce exactè in mortar. vitro.

Mucilag. gum. arabic. q. s. ut fiant pastilli lx.

Each of these will contain about one twelfth of a grain of the salt. A. T. CHRESTIEN.

Pilulæ Auri Muriatici Natronati.

Pills of Muriate of Gold and Soda.

- ℞. Amyli. solan. tuberos. gr. iv.
Gum. arab. ℥j.

In mort. vitr. exactè mistis adde terendo

Aur. mur. natron.—in ℥j aq. distillat. solut.—gr. x.
Fiant pilulæ cxx.

Each of these contains about one twelfth of a grain.

A. T. CHRESTIEN.

Unguentum Auri Muriatici Natronati.

Ointment of Muriate of Gold and Soda.

℞. Aur. muriat. natron. gr. iij—iv.

Axung. porcin. ℥ss.

Misce exactè. Fiat unguentum.

Used in friction.

GRÖTZNER.

℞. Aur. muriat. natron. gr. iiss.

Adipis recent. ℥iss. M.

The size of a bean to be placed in the nasal fossæ in scrofulous cases¹ along with the iatroleptic use of the powder before described.

RIECKE.

VI. AURUM NITRICO-MURIATICUM.

SYNONYMES. Auri Nitromurias.

German.—Saltpetersalzsaures Gold.

The nitromuriate of gold has been recommended of late years by Recamier, whose attention was directed to it by accident. A worker in gold had a cancerous tumour on the back, which, as it incommoded him, he touched frequently with the hand; this occurred whilst he was dissolving gold in aqua regia; after this the tumour soon presented another appearance, and disappeared in a short time. Recamier thought it probable, that the workman had received some of the solution upon his fingers, which had thus been applied to the tumour. Under such impressions, he employed it in the case of a female, who was affected with an extensive cancer; the disorganised parts resumed their natural texture, and completely healed, although the cancerous dyscrasy ultimately proved fatal. In the case of a female, with fungus of the neck of the uterus, a complete cure was effected by it; and in cancer of the uterus he found it very advantageous.

Recamier prepares it by dissolving six grains of pure muriate of gold in an ounce of aqua regia: and he applies it like other corrosive agents, taking care to confine it to the parts to be acted upon. When the object is to cauterise, it must be applied to the affected parts, until a whitish scab or crust is formed, which falls off in three or four days; after which the application may be repeated as often as may be necessary. The pain, caused by the operation, is

¹ See page 76.

generally insignificant, and in cases where it is violent it can be allayed by pledgets dipped in laudanum.

VII. AURUM OXYDATUM.

SYNONYMES. Oxydum Auri, Auri Teroxidum, Oxide of Gold, Peroxide of Gold, Auric Acid.

French.—Oxide d'Or.

German.—Goldoxyd, Oxydirtes Gold.

The oxide of gold prepared by calcination is the *crocus solis* of the Wirtemberg Pharmacopœia. The oxide is received also into the Pharmacopœias of Ferrara, and Hannover.

Magendie¹ recommends the following as one of the modes of preparation.

Take any quantity of chloride of gold, put it into a flask of white glass and pour upon it six or seven times its weight of boiling water, to dissolve the chloride; then add crystallised baryta gradually, until the liquid is no longer acid, as shown by a strip of litmus paper. The liquid is then boiled, permitted to cool, and filtered. The precipitate is washed several times with warm water; the water of the various washings is brought together and evaporated nearly to dryness; the saline mass when cool is then dissolved in water, and in this way more and more oxide of gold is obtained, which may be added to the other.

The oxide of gold is now washed with boiling water, until the water no longer affords a precipitate on the addition of nitrate of silver. It is then washed once or twice with water acidulated with nitric acid, to remove the small quantity of carbonate of baryta formed during the operation, and which may remain mixed with the oxide. These washings are repeated with cold water, until the instillation of sulphuric acid occasions no longer any white precipitate, which indicates that it is free from baryta.

The oxide is then dried at a heat of from 167° to 190° of Fahrenheit, after which it is kept in a cool and dark place in a well-stopped bottle.

The process recommended by M. Cottureau is the following.—An excess of magnesia must be boiled with a dilute solution of muriate of gold, till the solution loses its colour; the whole is then to be filtered, and the precipitate well washed; the result, which is

¹ Formulaire, &c.

aurate of magnesia, is to be treated with an excess of diluted nitric acid, which removes all the magnesia, and leaves the oxide in a pure state. This is to be again well washed and dried between sheets of bibulous paper, but without compression or exposure to light or heat.¹

In the French Codex it is directed to be prepared by boiling four parts of calcined magnesia with one part of terchloride of gold and forty parts of water. Then wash, first with water to remove the chloride of magnesium, and afterwards with dilute nitric acid to dissolve the excess of magnesia.²

In the condition of a hydrate, the oxide of gold is of a yellow colour, but when dried of a blackish violet. It is never entirely soluble in muriatic acid, always leaving behind a small portion, which is reduced to the metallic state during desiccation. Neither sulphuric nor nitric acid has an action upon it.

The oxide of gold has been administered by many physicians, and especially by Westring, Neil, Chrestien, and Legrand,³ in the same diseases as the other preparations.

BALLOTA LANATA.

SYNONYMES. *Leonurus Lanata*.

German.—Wolliger Wolfstrapp.

This plant belongs to the natural family Labiatae, and to the class Didynamia, order Gymnospermia. It grows exclusively and commonly in Siberia, in dry mountainous regions.

In its native country it has been long administered as a powerful diuretic, especially in dropsy. Both Gmelin and Pallas refer to it in this respect in their travels in Siberia. Within the last few years, its use has extended elsewhere; and it is now frequently employed in Russia, Germany, and Italy. It is said to be often adulterated with the *leonurus cardiaca*, *ballota nigra* and *marrubium*;⁴ and it is important, that the genuine Siberian plant should be used, as

¹ Amer. Journ. of Pharm. 2d series, ii, 110. Philad. 1837.

² Pereira, Elements of Materia Medica, Pt. i, p. 424. Lond. 1839.

³ Op. citat.

⁴ Schmidt's Jahrbuch der in- und ausländisch. gesamt. Medicin. B. iv, S. 275, and Riecke, Op. cit. S. 68.

the observations of Brera have shown the cultivated plant to be very powerless. For medicinal purposes, the whole plant has been employed, with the exception of the root.

The diseases, in which the *ballota lanata* has been administered abroad—for it has not been employed in this country—are the following:—

1. *Dropsy*.—Rehmann prescribed it several times with decided advantage; and where organic disease prevented the cure, the urinary secretion was always largely augmented by it. The chemical condition of the urine was likewise strikingly changed during its use; at first, it was whitish, afterwards darker, and ultimately almost black or of a deep brown, like the darkest beer. At times, according to Rehmann, when the accumulation of fluid was pretty well removed, a pain would occur in the hypochondres, indicating that the use of the *ballota* should be laid aside. Schilling, in Werchny-Udinsk, asserts, that he cured several cases of dropsy by it. Rupprecht and Muhrbeck administered it with the best effects, and Brera¹ found it extremely serviceable in hydropic conditions, especially where they had been preceded by, or were complicated with, rheumatic or gouty affections. Luzzato prescribed it with equal success; and Heyfelder who gave it according to the prescription of the Russian physicians, observed the urine to be of a blackish yellow hue at the commencement, and afterwards of a very dark colour. He found, however, that to keep up the diuresis it was requisite to combine it with other diuretics, or to change it for other agents.

2. *Rheumatism and Gout*.—In these diseases, the *ballota* is administered in Siberia. Brera, as well as his compatriots, Ghidella, Fontebuoni and Luzzato, have tested its efficacy by repeated trials. The pains generally soon disappeared under its use, and a cure took place without a relapse.

3. *Adiposis*.—In a case of this kind, it was exhibited in St. Petersburg by Dr. Weisse. The fatness was inordinate, and the remedy acted most favourably. It did not, however, occasion diuresis, but under its use an hemorrhoidal flux returned, which had previously been arrested.

MODE OF ADMINISTERING.

Decoction is the best form for administering the plant; from ℥ss to ℥j to ℥viii of water;—this portion to be divided into two

¹ *Antologia Medica*, No. 2. febbrajo, 1835.

halves, and to be taken in the course of the day. Rehmann boils ℥iiss to ℥ij of the coarse powdered plant in ℔ij of water down to half; to which he adds, according to circumstances, some diffusible excitant or a few drops of laudanum. Of this mixture he directs a cupful to be taken morning and evening, gradually increasing the dose.

BARYUM IODA'TUM.

SYNONYMES. Baryi Iodidum, Iodide of Baryum.

German.—Iodbaryum.

AND

BARYTA HYDRIODICA.

SYNONYMES. Hydras Baryi Iodati, Hydriodas Barytæ, Hydriodate of Baryta.

German. Iodwasserstoffsäure Schwererde; Hydriodsaurer Baryt.

This preparation has been introduced quite recently.

MODE OF PREPARING.

According to Tünnermann, the iodide of baryum is prepared by heating the hydriodate of baryta for a sufficient length of time, excluding the light: by the admission of air, the iodide is converted into baryum and free iodine. As the iodide of baryum, when it comes in contact with water—as is commonly the case, in prescriptions,—is immediately converted into hydriodate of baryta, it is simpler to employ the latter altogether.

The hydriodate of baryta is obtained by boiling baryta earth in a solution of iodide of iron in water (made by taking one part of pure iron filings, and four parts of iodine, pouring upon them from six to eight parts of water, agitating frequently and applying warmth gently until the fluid appears clear and almost colourless), or, what is cheaper, by boiling the solution of iodide of iron with carbonate of baryta, which must be added in small portions so long as there is any effervescence.

The fluid obtained by either process, after filtering, must be clear and neutral, and yield no bluish or blue precipitate with the ferrocyanate of potassa; should it yield a precipitate, the decomposition

of the salt of iron is incomplete. Should the solution, formed in the first manner, have an alkaline reaction, the excess of baryta must be removed by exposing the mixture to the air, whereby it becomes converted into a carbonate, and falls to the bottom. The solution is then evaporated until a pellicle forms, the heat being gentle; the crystals are placed quickly between printing paper (Druckpapier) and kept in a well stopped glass vessel. They form white radiated plates, which easily deliquesce in the air, and on that account cannot be prescribed in the form of powder, but may be dissolved in some aromatic water.

EFFECTS ON THE ECONOMY.

Jahn instituted several experiments with the iodide of baryum and the hydriodate of baryta, both on plants, on animals, and on man in a state of health and disease. In considerable doses, it acts as a poison on the organism, and as one of the acrid class. Administered in very small doses, and with great circumspection, he found it to be serviceable in scrofulous and similar morbid conditions, and as an alterative in morbid growths, hypertrophy, chronic inflammation, &c., in which conditions it proved equally useful with the muriate of baryta, mercury, or iodine.¹ Jahn's observations did not, however, lead him to speak positively regarding its advantages or defects; and he adds the caution—"Caute, per Deos, incede, latet ignis sub cinere doloso." Jahn's observations were published in 1830, and, according to Riecke, he has been since silent on the subject. Rothamel administered the hydriodate in a desperate case of scrofula, occurring in a patient twenty-one years of age, with great success. He began with one eighth of a grain three times a day, and increased the dose gradually during a protracted administration of the article, until three grains were taken four times daily.

Biett has administered it frequently in cases of scrofulous swellings, and at times externally, according to the following form:—

℞. Baryi iodat. gr. iv.
Axungiaë, ʒj. M. fiat unguentum.

¹ Riecke, Op. cit. S. 71.

BERBERINA.

SYNONYMES. Berberinum, Berberine.

German. Berberin.

The inner bark of the *Berberis vulgaris* is of a yellow colour, and a bitterish, somewhat astringent, taste. It is cathartic, and was formerly used in jaundice; originally, perhaps, in consequence of the "signature" of the yellow colour.¹ In more modern times, it has been again recommended in the same disease on the faith of experiments.²

The bitter principle of the root was discovered a few years ago by Buchner and Herberger, and its properties have been investigated by Brandes.³ Buchner first recommended, at a meeting of the German Association of Naturalists and Physicians in the year 1834, that it should be received into the *Materia Medica*; but hitherto few experiments have been made with it.

METHOD OF PREPARING.

An alcoholic extract of the root of the *berberis vulgaris* is prepared, to which water is added. This throws down a pulverulent brown substance; the fluid is then poured off; and the substance dried; it is then treated with alcohol, which takes up the berberine, leaving a small portion undissolved. By evaporating the alcohol, the berberine remains.⁴

Thus prepared, berberine resembles an extract; it is of a brownish yellow colour, translucent, and smells like the root; its taste is a pure bitter, and it becomes soft in the air. Buchner⁵ succeeded in obtaining the bitter principle pure, and in a crystalline form. Its reaction is neither alkaline nor acid; it is soluble in alcohol and water, but not so readily in the latter as in the former. When crystallised, it requires 600 parts of water for its solution; whilst in alcohol, at a medium temperature, it is soluble in 100 parts. It approximates the alcaloids in its nature, as with certain acids it forms crystallisable compounds. It is not

¹ Ray's *Historia Plant.* ii, 605.

² *Lond. Med. Repos.*, new series, i, 38.

³ *Archiv. der Apotheker Vereins*, ii, 29.

⁴ Riecke, *Op. cit.* S. 442.

⁵ *Journal de Pharmacie*, and *Philadelphia Journal of Pharmacy*, vii, 328. Philadelphia, 1835.

soluble in ether. The brownish yellow solution formed by it, is turned of a reddish brown by alkalies, like the infusion of rhubarb, and acids restore the colour.

EFFECTS ON THE ECONOMY.

According to Buchner, no injurious consequences are to be apprehended from the administration of berberine as a therapeutical agent: of this he had an opportunity of satisfying himself both on his own person and on others. When labouring under indigestion, he took it with the best effects; not only was the dyspepsia removed, but also a yellow hue of the skin which had previously existed. He recommends it, therefore, as an excellent stomachic, especially when there is disturbance of the functions of the liver. In doses of two, five or ten grains, it only aids the appetite, but in larger doses—fifteen to twenty grains—it acts upon the bowels without inducing tormina, and therefore not as a drastic.

Within the last few years Koch has published some observations on the use of the berberine. He treated several cases with it as prepared by Buchner himself, when he found all his results confirmed, and that it merited a high rank amongst bitter agents. He gives two cases of marked disturbance of the digestive function, in which the berberine afforded essential service.

BIGNONIA CATALPA (SILIQUEÆ).

SYNONYMES. Catalpa, Catalpa Cordifolia, C. Arborescens, C. Arborea, Catalpa or Catawba Tree.

The *Bignonia catalpa* belongs to the natural family Bignoniaceæ; class Didynamia; order Angiospermia. It is a tree well known in this country, but is not applied to any medicinal use.

According to Kämpfer and Thunberg, the Japanese physicians consider the pods of the *Bignonia catalpa* to be a powerful remedy in different asthmatic affections. This gave occasion to several Neapolitan physicians—and especially to Professor Antonucci—to institute experiments in reference to its virtues, and their report was decidedly favourable. Brera also extols it in asthma.

As to the precise mode in which it acts, we have no exact

information. Dierbach and Richter, according to Riecke,¹ place it amongst the *Acria*; whilst, according to the analysis of Grosso,² it seems more probable that its active principle is of a fatty nature, resembling the butter of the cacao. We think it extremely probable, that it possesses no other virtues than those of a simple demulcent, and that the properties ascribed to it have been mainly, if not wholly, derived from the substances associated with it. Brera, for example, administered it with the following additions:³

	℞. Siliquar. catalp. ℥ss.
	Aquæ fontan. q. s. ad colatur. ℥viij.
Adde	Oxymel. scillæ, ℥ss.
Or	
	℞. Siliquar. catalp. ℥ss.
	Senegæ rad. ℥ij.
	Aquæ fontan. q. s. ad colatur. ℥viij.
Adde	Oxymel. scillæ, ℥i.

To be taken by little and little.

BOLETUS LARICIS.

SYNONYMES. *Boletus purgans*, *B. albus*, *Agaricus albus*, *Fungus Laricis*, *Polyporus officinalis*, *Fungus of the Larch*.

French. Agaric blanc.

German. Lerschenschwamm.

This fungus grows on the stem and larger branches of the larch. Formerly it was administered as a cathartic, but in this respect it has become obsolete. Still it is retained in many pharmacopœias; for example, in those of Amsterdam, Bavaria, Brunswick, Paris, Ferrara, Geneva, Hamburg, Hanover, Oldenburg, Poland, Prussia, Saxony, Sweden, Wirtemberg, and Wurzburg. Recently, it has been administered frequently in the colliquative sweats of phthisis.

¹ *Op. cit.* S. 72.

² *Gazette Médicale de Paris*, 1834, p. 8.

³ *Ricettario Clinico*, Pad. 1825.

Barbut of Nismes made many trials with it,¹ which were favourable; and the experience of Andral was similar.² By several of the German physicians equally advantageous results have been obtained—as by Toel and Trautzsch, so that, as Riecke³ suggests, it deserves, perhaps, to be better known and investigated. Recently, Kopp has added his testimony in its favour.⁴

Formerly, as a cathartic, half a dram to a dram of the powdered boletus was given. In profuse diaphoresis it is administered in doses of from two to six grains. This dose, repeated for a few evenings, according to Barbut, arrests the sweating;—Riecke thinks through its revolent excitation of the abdominal nerves, for which reason he suggests, that the propriety of the union of opiates with it, to prevent its purgative effect, may be questionable.

Kopp gives it in the dose of three grains, morning, noon, and night. If it acts upon the bowels, which is rarely the case, the dose must be diminished.

BRAYERA ANTHELMINTICA.

This plant is a native of Abyssinia, and belongs to the family Rosaceæ Sanguisorbeæ of Decandolle, Icosandria Digynia of Linnæus. It was first taken from Abyssinia to Europe by Dr. Brayer, from whom it received its name. The flowers are the parts used in medicine, and they yield, on examination, an extractive matter, containing tannin, which is most readily taken up by hot water, and, consequently, the decoction is the best preparation.

In Abyssinia, the flowers of the brayera are said to have been employed with the greatest success in tapeworm, but in Europe, no experiments had been made with them until Dr. Plieninger, having become acquainted with a missionary from Abyssinia, and heard his description of their wonderful effects, obtained some of the flowers from him,⁵ which he subjected to his friend, Dr. Kurr, who descried on examination the principles above mentioned.

¹ Burdach, in Journal der praktisch. Heilkund. von Hufeland, Mar. 1830.

² Journal de Pharmacie, vol. xx.

³ Op. cit. S. 73.

⁴ Denkwürdigk. in der ärztlich. Praxis. Frankf. 1836, S. 344, cited by Riecke.

⁵ Riecke Op. cit. S. 73.

With the rest of the flowers Dr. Plieninger made trial in two cases. He took a handful of the blossoms, about ℥j or ℥iss and boiled them in ℥xvi of water down to one half, adding to the strained liquor as much honey as counteracted, in some measure, the objectionable taste. This decoction was taken by a delicate woman about 30 years of age, who had previously taken the extractum filicis maris in pilular form, according to Peschier's plan, without success. In the course of the day she passed numerous fragments of *tænia*, mixed with mucous discharges, without experiencing any striking inconvenience from the remedy. From this time, she remained free from the parasite.

A robust man, 38 years of age, who had taken large quantities of tartar emetic in consequence of violent inflammation of the lungs whilst he lay sick of this disease, discharged a great many portions of *tænia*, without having previously experienced any inconvenience from the presence of the entozoon. In July, 1834, he took the same decoction. Since then he has had no appearance of the *tænia* in his evacuations.

Although but few cases have occurred in which the *brayera* has been administered in European practice, Dr. Plieninger considers, that it is a valuable addition to the materia medica, inasmuch as it can be administered to delicate persons and children, without violence being done to the whole organism, as is the case with many of the true anthelmintics. The article has not been imported in sufficient quantities into Europe to admit of the necessary trials for fully testing its efficacy. In this country—so far as we know—it has not yet been seen.

BROMINUM.

SYNONYMES. Bromium, Brominium, Muride, Bromine.

French. Brome.

German. Brom.

This elementary substance was discovered in 1826, by Balard, of Montpellier. In its chemical properties it is allied to chlorine and iodine. Balard detected it whilst occupied in some investigations on the water of saltponds, and gave it the name bromine—from *βρωμος*, "a stench or smell"—on account of its disagreeable odour. It is met with chiefly in sea water, and in certain animal

and vegetable substances that live therein. It has likewise been found in many mineral waters, of this and other countries, and especially in the salt springs—as of Salina, by Professor Silliman, and of Kenawha, by Professor Emmet.

METHOD OF PREPARING.

Balard's mode of preparing bromine consists in passing a current of chlorine through bittern, after which ether is added, and the two liquids are strongly agitated. The chlorine decomposes the hydrobromate of magnesia—the form in which the bromine exists in the bittern—and converts the hydrobromate into a muriate of magnesia, setting the bromine free. The ether dissolves the evolved bromine, the mixture assuming a hyacinth red colour. The ethereal solution is agitated with caustic potassa, by which hydrobromate of potassa is generated; the ether becoming colourless and pure, and fit to be used for dissolving fresh portions of bromine. When a sufficient quantity of the hydrobromate has been obtained, it is mixed in a retort with peroxide of manganese, and acted on by dilute sulphuric acid, by which the bromine is given off. The sulphuric acid sets free the hydrobromic acid, which, at the moment of its disengagement, is deprived of its hydrogen, by the oxygen of the peroxide of manganese, and is thereby converted into bromine. The bromine passes over in reddish vapours, and is made to condense under water, contained in an appropriate receiver.

M. Bussy¹ prefers the following form. The mother waters of kelp (*Soude de Varecq*), after iodine has been precipitated from them by means of chlorine, contain bromine in the state of a metallic bromide, when care is taken to add no more chlorine than is required to precipitate all the iodine. To 1250 parts of these mother waters, 32 parts of peroxide of manganese in powder, and 24 of common sulphuric acid at 66° are added. The mixture is then put into a tubulated glass retort, to which a tubulated receiver is adapted, and to the latter a tube, which dips into a flask. The retort and receiver as well as the tube must be ground so as to fit accurately without lutes or corks, which would be destroyed by the chlorine.

Every thing being arranged, the retort is heated until the liquid is made to boil, when the bromine condenses in the receiver under

¹ Journal de Pharmacie, Janvier, 1837.

the form of red oily striæ, with a small quantity of water. The operation must be arrested when the red vapours cease to be produced.

By slightly heating the receiver, without dismounting the apparatus, the bromine may be made to pass over into the flask, in which it will condense on cooling.

The mother waters used in this preparation should not be rejected, until it is evident on the addition of a fresh quantity of sulphuric acid and oxide of manganese, that they contain no more bromine.

Bromine, at the ordinary temperature, is a fluid of a blackish red colour, when regarded in quantities,—but of a hyacinth red when placed in a thin layer between the eye and the light. Its smell is strong and disagreeable, resembling that of chlorine. Its taste is strong. It colours the skin yellow—the colour gradually disappearing of itself. Its specific gravity is 2.966. It is readily set free; and, when volatilised, assumes the form of dark red vapours. It boils at 117° ; is soluble in water, and the solution is of a yellow colour. In its chemical relations with other bodies, bromine, as before observed, resembles chlorine and iodine; but the chlorine appears to have more power, and the iodine less, than the bromine, as the bromine is separated from all its combinations by the chlorine, whilst it decomposes the compounds of iodine, and assumes the place of the latter. It forms acids both with oxygen and hydrogen.

EFFECTS ON THE ECONOMY IN HEALTH.

Experiments have been instituted to discover the influence of bromine on the animal economy, and especially by Barthez.¹ In this respect, also, bromine resembles iodine, and like it belongs to the class of irritant poisons. Twelve grains of bromine, dissolved in water and injected into the jugular vein of a dog, destroyed it almost instantaneously. Cough occurred; the respiration and circulation were accelerated; the pupils dilated; the male organ was erect; and these signs were followed by involuntary discharge of the excrement, and at times stiffness of the upper and lower extremities. On dissection, Barthez found the cavities of the heart full of coagulated blood, and the lungs gorged with the same

¹ De l'Action du Brome, &c. (Thèse) Paris, 1828. See, also Fournet, in Bulletin Général de Thérapeutique, Février, 1838.

fluid; in the *venæ cavæ* there were dark coagula; and, in the stomach and intestines, small, bloody, blackish cylinders, similar to cylinders of lunar caustic.

The same quantity introduced into the stomach caused death in three or four days, when the *œsophagus* was tied; when, however, the animal was able to vomit, fifty to sixty drops were requisite. The poison acts less intensely when it is given in conjunction with aliment; it produces coughing, excitement, nausea and vomiting: constant sucking of the tongue was noticed, with frequently extraordinary restlessness and anxiety, and debility gradually augmenting until death. On opening the body the stomach has been found contracted; the mucous membrane wrinkled, at times softened, and frequently the seat of roundish ulcerations of an ashy green colour. Near the pylorus, Barthez found black spots, which could be readily scraped off with the back of the scalpel, and left gangrenous ulcers exposed. Barthez recommends magnesia as an antidote to bromine, but he rests his recommendation on a single observation only. Butzke obtained similar results from his experiments. In one case, only, in which a dog died a few hours after a dose of three drams of bromine, he found the intestines unchanged, and death could only be ascribed to the paralysing influence of the poison on the nervous system.¹

EFFECTS ON THE ECONOMY IN DISEASE.

Pourché first used both the pure bromine and the hydro-bromate of potassa for therapeutical purposes. He found it very efficacious in scrofula, especially in dispersing strumous swellings, both when given internally and applied externally.²

In a case of very large *goître* it was highly serviceable. According to Pourché's observation, it excited heat in the face, headach, dryness of the throat, &c., which, however, soon disappeared. Pourché gave the bromine internally, diluted with forty parts of distilled water, beginning with five or six drops of this mixture, and gradually raising the dose. It has also been added in a dilute state to lotions and cataplasms. The remedy is not, however, much used.

Magendie frequently administered the bromine, but more commonly some of its preparations. He prescribed it in cases in which

¹ Christison on Poisons, 3d edit. p. 186.

² Bulletin Général de Thérapeutique, No. 14. Juillet 30, 1837.

the iodine did not appear to exert the proper efficacy, or where the patient had become accustomed to its use. The diseases in which he used it were chiefly scrofula, amenorrhœa, and hypertrophy of the ventricles of the heart.

More recently, it has been administered by M. Fournet,¹ in cases of chronic arthritis, both internally and externally; but his facts, as he himself remarks, were too few to enable him to deduce any general conclusions as to the therapeutical value of the remedy in those affections. He always gave it in a pure state, in the form of mixture, with a solution of gum: externally, it was applied in the form of alcoholic mixture to the affected joints.

The dose was at first two drops in four ounces of the vehicle; and it was gradually increased by two drops at a time, until as much as sixty drops were given in the twenty-four hours.

The alcoholic mixture, used by M. Fournet as an external application, consisted, at the commencement, of ten drops of the bromine to an ounce of alcohol: this was augmented daily by five drops until it reached one hundred and twenty drops.

The preparations of bromine are described in other parts of this volume.

BRUCINA.

SYNONYMES. Brucinum, Brucia, Brucium, Brucine.

This alkaloid was discovered by Pelletier and Caventou in 1819, in the bark of the false angustura (*brucea antidysenterica*). It is found also in small quantities in the nux vomica, and in St. Ignatius's bean.

METHOD OF PREPARING.

An alcoholic extract of the false angustura bark is prepared, which is dissolved in a large quantity of cold water, and filtered, in order to separate the fatty matter.

The colouring matter is precipitated by acetate of lead, the excess of this is thrown down by sulphuretted hydrogen gas, and the brucine by an alkaline base, for which purpose magnesia may be employed. The precipitate from the magnesia

¹ Bulletin Général de Thérapeutique, Février, 1838.

is then washed, dried, and treated with alcohol, which lays hold of the brucine: this is obtained by evaporation. As the brucine is somewhat soluble, the precipitate of the magnesia ought not to be washed too much. The brucine thus obtained is coloured, but it may be procured colourless by forming an oxalate of brucine, and treating it with a mixture of equal parts of alcohol and ether. The oxalate is thus deprived of its colouring matter; after which it is decomposed by magnesia, and the brucine is thus obtained wholly pure and devoid of colour.

Pure brucine is of a white colour, and forms regular crystals in the form of oblique prisms, having a base representing a parallelogram; it has a pearly lustre, tastes very bitter, and is soluble in 500 parts of boiling water, and in 850 parts of cold. In alcohol it dissolves readily, from which solution it is obtained in the crystalline form. When exposed to the influence of heat, it melts at a temperature very little above that of boiling water. At a higher temperature it is decomposed, and affords the same products as vegetable substances that do not contain azote. With the acids, brucine forms neutral salts, which differ from the salts of strychnine. The sulphate of brucine crystallises in very fine needles, and resembles the sulphate of morphine, but has a much more bitter taste. The nitrate of brucine does not crystallise, which constitutes an essential difference between brucine and strychnine. With an excess of nitric acid, the salt has a beautiful pearly (*nacre*) colour.

EFFECTS ON THE ECONOMY.

Brucine acts energetically on the animal economy in the same manner as the false angustura, but much more strongly. It is similar, in its operation, to strychnine, but is considered to be weaker in the proportion of one to ten, according to Pelletier; one to twelve, according to Magendie;¹ and one to twenty-four, according to Andral.²

It requires four grains of brucine to kill a rabbit, whilst half a grain of strychnine is sufficient. A tolerably strong dog, to which three grains of brucine had been given, was affected with symptoms resembling tetanus, but did not succumb.

Pelletier is of opinion that brucine, or rather the alcoholic extract of the false angustura, might be substituted in practice for the

¹ Formulaire, &c. des Nouveaux Médicaments, &c.

² Journal de Physiologie de Magendie, iii, 267, Juillet, 1823.

extract of *nux vomica*; its operation is nearly the same, whilst there is no danger of its acting too violently.

Andral has frequently prescribed brucine, and his deductions are, that we have it far more under our control than strychnine. Like strychnine, it has been given in cases of paralysis with varying success. It would appear to have acted most beneficially in paralysis resulting from lead poisoning. Magendie administered it in two cases of atrophy, one of the leg, and the other of the arm, with success.

MODE OF ADMINISTERING.

Brucine, according to Magendie, may be given either in pills or tincture; gradually augmenting the dose. Andral raised it from half a grain to five grains. Magendie recommends, that the alkaloid should always be that obtained from the false *augustura*; the brucine of the *nux vomica* being mixed with a portion of strychnine, which adds to its activity, and renders it difficult to determine the dose. The following formulæ are recommended by him:—

Pilulæ Brucinæ.

Pills of Brucine.

- ℞. Brucin. pur. gr. xij.
Conserv. rosar. ℥ss. M. exactiss. et fiant pilulæ xxiv.

One pill to be begun with—twice a day.

Tinctura Brucinæ.

(*French, Alcool de Brucine.*)

Tincture of Brucine.

- ℞. Alcohol (36° Aréom.) ℥j.
Brucin. gr. xvij. M.

Of this tincture, from six to twenty-four drops may be given, in the form of mixture, in any vehicle.

Mistura Brucinæ.

Mixture of Brucine.

Potio Stimulans.

- ℞. Brucin. gr. vi.
Aquæ distillat. ℥iv.
Sacchar. alb. ℥ij. M.

Dose.—A table-spoonful night and morning.

MAGENDIE.

CAINCÆ RADIX.

SYNONYMES.—Rad. Chiococcæ, Cainanæ, Caninanæ, Cahincæ, Kahincæ, Serpentariæ Braziliensis; Cainca Root.

Portuguese.—Raiz Crusadinha, R. Preta.

German.—Caincawurzel.

The plant, which furnishes the root introduced into Europe of late years, and which has since become known as a remedial agent, is the *Chiococca anguifuga*, of the family Rubiaceæ, sexual system, Pentandria Monogynia.¹ The shrub grows wild in the forests of Brazil, especially in the province of Minas Geraes, and the root is used there against the bites of serpents. This root is of the thickness of the finger, round, and knotty; the surface smooth or irregularly wrinkled; the wood tough and of a whitish colour; the smell disagreeable, especially that of the fresh root; and the taste at first like that of coffee, but afterwards nauseous and pungent. The bark of the root alone possesses efficacy, the woody portion having no action. The bark separates readily from the wood; it is thicker on the root itself than on its branches: and on the outside, is of an amber or brownish yellow green colour; yellower and brighter on the youngest parts: the epidermis is not easily separated. According to the chemical investigations of Pelletier and Caventou,² the following are found to be the constituents of the bark:—1. A bitter principle, crystallisable in small, white, silky, shining needles; inodorous, and very soluble in hot alcohol, which communicates to the whole plant a degree of astringent bitterness, and at the same time has an acid reaction on litmus paper. In order to separate this acid, which has been termed by those chemists the *Acidum Cahincicum*, in a pure state, the alcoholic extract of the root must be dissolved in water, filtered, and precipitated by lime, until the fluid loses all bitterness; the precipitate is then decomposed by oxalic acid and boiling alcohol; or the acetic or muriatic acid may be dropped into an aqueous decoction of the bark of the root, and, in the course of a few days, the acidum cahincicum will separate in the form of small crystals. With the cahincic acid, prepared in this way, however, some colouring matter is still united. 2. A fatty, green, nauseous smelling sub-

¹ Art Chiococca, in Encyclopäd. Wörterb. vii, 521. Berl. 1831, and Von Martius, Spec. Mat. Med. Brasil, i, 18.

² Journal Général de Médecine, Mai, 1830, and Phil. Journ. of Pharmacy, iii, 165. Philad. 1831.

stance, which communicates to the plant its smell. 3. Yellow colouring matter, and 4. A viscid colouring matter.¹

EFFECTS ON THE ECONOMY.

The effect of the cainca root seems to be especially exerted on the digestive and urinary organs. It occasions watery evacuations and diuresis. From the experiments, however, of Albers², made on a great number of dropsical patients, in the Charité at Berlin, he was induced to deny its diuretic powers, and to place it amongst the drastic purgatives, by the side of the helleborus niger. Wolff was of the same opinion. According to Von Langsdorf,³ it is a highly efficacious emmenagogue, possessing also—to use his own language—considerable resolvent virtues, and hence employed in dropsies, that are connected with obstructions in the abdomen. Riecke,⁴ asserts, that he had occasion to employ it in two cases of ascites complicated with induration of the liver. He had no expectation of effecting a radical cure, but it afforded no palliation; diuresis was not excited, whilst nausea, colic, and diarrhœa supervened, so that he discontinued it: he gave it in decoction. Others have observed the same inconvenience from its use, or have found it wholly ineffectual; for example, B. Heyfelder, Reinhardt, Bartels,⁵ and others. Riecke suggests the possibility, in these cases, of adulteration of the drug. On the other hand, the cainca has been highly extolled by François, Ribes, Wagner, Solieer, Löwenstein,⁶ &c. but particularly by Von Langsdorf.

The main diseases in which the cainca is recommended, are, *First*. Dropsies, in which many favourable trials have been made by Von Langsdorf, Spitta,⁷ Guddoy, Engler, François, Wagner, Solieer, Robredo,⁸ &c. *Secondly*. Intestinal worms, against which it appears to act like other drastics. *Thirdly*. In obstructed menstruation; on this subject, however, farther trials are needed. When it

¹ Journal de Pharmacie; xvi, 465.

² Medicin. Zeitung. No. iv. Sept. 1832.

³ Hecker's Litter. Annal. B. iv. S. 395, and Rust's Repertorium, B. xiv. S. 458.

⁴ Die neuern Arzneimittel, u. s. w. S. 84. Stuttgart, 1837.

⁵ Gräfe und Walther's Journal der Chirurgie, u. s. w. xxiv, S. 470. Berlin, 1836.

⁶ De radice Caincæ ejusque in morbis hydropicis virtute. Berol. 1828.

⁷ Hecker's Litterar. Annal. iv. 396.

⁸ Journal de la Academia de Medicina de Méjico. Oct. 1836, and Brit. and For. Med. Review, p. 562, Apl. 1838.

operates as an emmenagogue it is probably altogether like cathartics that act more especially on the lower part of the bowels, that is, by contiguous sympathy. *Fourthly.* M. François has recommended it highly in catarrhus vesicæ, but the experience of others has not confirmed this.¹ It may be mentioned, that in its native country, it is used for rheumatic pains; in a peculiar kind of pica experienced by the negroes of South America; and, as already remarked, against the bites of serpents.

MODE OF ADMINISTERING.

The cainca is given in various forms—powder, infusion, and decoction; and, besides these, a tincture and an extract have been made of it. A syrup and a wine have also been recommended. To form the latter, one ounce of the powdered root is infused in a pint of wine; the tincture is made with one part of the root and eight parts of alcohol at 20°. The alcoholic extract is considered to be the most uniform in strength, and has therefore been preferred by many. The syrup is formed by dissolving ʒiiss of the extract in a little alcohol, mixing this with a pint of hot simple syrup, and allowing it to boil for some time, in order that the alcohol may evaporate. The dose of the powder is from ʒi to ʒss in the twenty-four hours. It appears, however, to be the most objectionable form, and to give rise to unfavourable symptoms more frequently than the others. Opinions vary as to whether the infusion or the decoction should be preferred. According to Caventou and Pelletier, boiling extracts very well the efficacious parts of the root, and there are cases in which the decoction has rendered essential service after the infusion had been administered without success. Of the decoction, from ʒj to ʒiij are given in the day. Of the extract the dose, in the twenty-four hours, is twenty to thirty grains; of the tincture ʒj to ʒij.²

The decoction, used by Spitta and others, was made as follows:

Decoctum Radicis Caincæ.

Decoction of Cainca Root.

℞. Rad. caincæ, ʒij.

Coque cum aquæ commun. ʒiiss ad dimidiam partem, et cola.

Dose.—A table-spoonful three times a day. VON LANGSDORF.³

¹ Bulletin Général de Thérapeutique, No. 13, Juillet, 1837.

² Journal de Chimie Médicale, Mai, 239–242. Paris, 1827.

³ Hufeland und Osann's Journ. B. lxii, St. 2.

By others, the following form has been employed.

℞. Rad. cainc. ℥j.

Aquæ commun. ℔ij.

Coque ad dimidiam partem et cola.

Dose.—Two table-spoonfuls three or four times a day. ENGLER.

Dr. John H. Griscom,¹ of New York, considers there is a remarkable analogy between the cainca and the apocynum cannabinum,

The *Acidum Cahincicum*, described above, is said to possess tonic, cathartic and diuretic powers, and has been used successfully in some cases by François, in the dose of six grains gradually increased to fifteen.

CALCIS CHLORIDUM.

SYNONYMES. Calcis Hypochloris, Oxychloruretum Calcii, Protochloruretum Calcii; Chloruretum Oxydi Calcii, Bichloruretum Calcis, Oxymurias Calcis, Calx Oxymuriatica, C. Chlorinata, Calcaria Chlorata, Chlorum Calcariae, Chloretum Calcariae, Calcaria Chlorica, Chloride or Chloruret of Lime, Tennant's Bleaching Powder.

French.—Protoxichlorure de Calcium, Oxichlorure de Chaux, Chlorure d'Oxide de Calcium, Bichlorure de Chaux, Oximuriate de Chaux, Muriate Suroxigéné ou Oxigéné de Chaux, Chlorate ou Souschlorate de Chaux, Poudre de Blanchement, Poudre de Tennant.

German.—Kalkchlorid, Chlorkalk.

Chloride of lime is a compound of chlorine and calcium.

METHOD OF PREPARING.

It may be prepared either in the dry or moist way. In the former case, the chloride is made to act on the hydrate of lime in a pulverulent form; in the latter, the chlorine, in a gaseous state, is passed into lime water. For technical purposes, the latter is most used; for pharmaceutical, the former. In the London pharmacopœia, it is directed to be prepared as follows:—"Take of hydrate of lime a pound, chlorine as much as may suffice; send in the chlorine to the lime in a proper vessel, till it is saturated. Chlorine

¹ Amer. Journal of the Medical Sciences, for May, 1833, p. 55.

is very easily evolved from binoxide of manganese, mixed with muriatic acid, by a gentle heat."¹

The chloride is generally however obtained from large chemical establishments.

Chloride of lime has the appearance of a white, loose powder, of a sour, bitterish and somewhat biting taste, exhaling a marked smell of chlorine, and dissolving with tolerable facility in water, at the same time giving off much chlorine gas.²

EFFECTS ON THE ECONOMY.

The action of the chloride of lime is generally esteemed to be analogous to that of the liquid chlorine; Hufeland, however, assimilates it to that of the muriate of lime. The data have been considered as scarcely, perhaps, sufficient to determine its precise operation. It appears to us, however, to act mainly by means of its chlorine, which, being loosely combined, is readily disengaged;—all acids, even the carbonic, occasioning its separation. It is not much employed internally, but according to Cima, who gave it in scrofulous affections, it occasions slight pains in the abdomen, burning in the stomach, and at times diarrhœa.

As to its *internal administration* Cima, it has been observed, gave it in cases of scrofulous swellings. By Cloquet it was used both internally and externally, in gangrenous ulcers; and by Gräfe, Deschamps, and Graves,³ in cases of fœtor oris.

In a case of pectoral disease, with great fœtor of the breath and expectoration, it was administered by Drs. Graves and Stokes with remarkable benefit. A pill of three grains of the chloride with one of opium being given three times a day, and the quantity being increased to twelve grains a day: the bed was also sprinkled with a solution of the chloride.

By Reid⁴ it was administered in dysentery, and in a bilious typhus occurring in summer; by Dr. Copland⁵ in the last stage of typhus fever, when the evacuations were highly offensive, given in draughts

¹ Brande's Dictionary of Materia Medica, p. 135. Lond. 1839.

² Link, Art. Chlor, in Encycl. Wörterb. der Medicin. Wissenschaft. vii, 579. Berlin, 1831.

³ Dublin Hospital Reports, vol. v.

⁴ Transactions of the Association of Fellows and Licentiates of the College of Physicians in Ireland, vol. v. 1838.

⁵ Houlton's Appendix to translation of Magendie's Formulary, p. 163.

of aromatic water with mucilage; by Groh, Cohen, and Schlesier¹ in phthisis, and by Gräfe in gonorrhœa. In none of these cases is it presumable, that the chloride of lime possesses virtues not contained in liquid chlorine.

For *external use* it has been adopted in various cases, and especially in ulcers. According to Trusen, an aqueous solution of the chloride is proper for torpid ulcers of almost all kinds—the phagedenic, the scrofulous, &c. In syphilitic ulcers it appears to be of use when the chancre is sloughing, and eats deep into the flesh.²

Trusen employed the solution formed by rubbing from ʒiij to ʒiv. of chloride of lime with a pint of water, pouring off the supernatant fluid after it had stood a quarter of an hour, and applying it by means of pledgets of lint to the ulcer, renewing the application whenever the lint became dry. In this way he found the profuse ichorous secretion from old ulcers diminish, the offensive odour abate, and fresh and healthy granulations spring up. By the same kind of treatment, phagedenic, herpetic, and scrofulous ulcers generally cicatrised speedily and permanently.³

Trusen employed, at the same time, the antimonium crudum with cathartics; and in all cases he directed strict repose and regulated diet.

Trusen's observations have been confirmed by many modern physicians, amongst whom may be mentioned Labarraque, Lisfranc, Ekl, Lemaire, Heiberg, and Kopp. In ozæna good effects were observed from it by Horner,⁴ Awl,⁵ Heron,⁶ and Strathing: and a solution of it, in the form of injection, was found serviceable in fistula, by Trusen and Ricord. Even in cancerous ulcers, recourse has been had to it by Heiberg, Labarraque, &c.: and in all cases it corrected the offensive odour, and, at times, the ulcer itself assumed a more favourable appearance.

Dr. Frohlich⁷ used it with advantage in a cancerous affection of the face, in the strength of one part of the chloride to sixteen parts of water.

In such cases it has been recommended, in order to have the

¹ Casper's Wochenschrift für die gesammte Heilkunde, No. 37, 1838.

² Dr. Mene, in Gazette Médicale, Feb. 11, 1832.

³ See, also, Houlton's Appendix to Magendie's Formulary, p. 162.

⁴ Amer. Journ. of the Medical Sciences, No. xi.

⁵ Ibid. No. xxii. for Feb. 1833, p. 543.

⁶ Ibid. Nov. 1836, p. 271.

⁷ Medicin. Jahrbücher des k. k. österreich. Staates. B. xvii. S. 168. Wien, 1834.

concentrated action of the chloride, that it should be formed into a paste by admixture with water, and be applied in this manner.

It has been used, also, in cases of ulceration of the mouth, by Kopp, Angelot, Heiberg, &c., applied either in the form of solution or of a soft paste.

In cases of wounds the application of a solution of the chloride has been recommended by many, as by Trusen, Ekl, Lisfranc,¹ to promote cicatrisation after the inflammation has subsided.

In a case of punctured wound, received in dissecting, and when the inflammation was proceeding up the arm with alarming rapidity, and the pain and tension were extreme, the patient experienced immediate relief from a solution of the chloride used as a lotion, combined with the free use of leeches.²

Gubian³ has proposed to apply a solution of it to prevent the pitting from small-pox. The matured pustules are to be opened and washed with a weak solution; desiccation takes place very promptly, and, it is said, no marks or pits are left.

On account of its antiseptic properties, the chloride has been applied in cancrum oris by Labarraque, Richter, Berndt, and numerous others, and in the sloughing affections of the female organs of generation of an analogous nature, by Labarraque and Ekl; in hospital gangrene by Percy, Labarraque, Siedmogrodzki, Delpech, and Renard; in gangrene of the scrotum, as well as in ordinary gangrene, by Heiberg and Trusen, in all of which cases it has been of decided efficacy.⁴

In such cases it may be applied either in the form of the paste above mentioned, or in strong solution— ʒij. to ℥j. of water.

In burns of the second and third degree, when they are not spread over too great a surface of the body, a solution of the chloride of lime, according to Trusen, markedly diminishes the pain, moderates the too great suppuration, and excites, especially in the second degree, sound granulations, and in the third, speedy separation of the dead portions, and in both cases a smooth and firm cicatrix. Either a solution of the chloride united with mucilaginous substances, or a liniment prepared of the chloride may be applied.

¹ Bulletin Général de Thérapeutique, Juillet, 1838.

² Alcock, Essay on the use of the Chlorurets, &c. London, 1827.

³ Journal de Chimie Médicale, vi. 315.

⁴ Riecke, Die neuern Arzneimittel, u. s. w. Stuttgart, 1837.

Lisfranc's observations¹ entirely accord with those of Trusen. Lisfranc applies compresses spread with cerate over the burnt parts; the compresses having holes in them so that the burnt places are exposed; they are then covered with lint soaked in a solution of chloride of lime, which is kept in situ and moistened as it becomes dry. A solution of the chloride of lime, as well as of the chloride of soda, may be applied, indeed, with advantage in the first stage of a burn or scald; and Mr. Holt² affirms that he knows nothing so efficacious in a "black eye."

Dr. Chopin,³ too, affirms, that in wounds produced by contusion, laceration, or by the explosion of gunpowder, where there is much pain, speedy and certain relief is produced by the chloride of lime, the dressings being kept constantly wet with a solution of it; he found it, as well as the chloride of soda, very serviceable also in cases of sore nipples.

In chilblains the chloride has been used, both in the form of solution and of liniment with advantage; and not only in ulcerated pernio, but where the skin was unbroken, by Trusen, Lisfranc, Gräfe and others. In many cases, however, it has been found advantageous to diminish the inflammation by the application of leeches before it was employed. In cases of deeper frost bites than those which produce pernio, the chloride has likewise proved beneficial.

In salivation, caused by mercury, this agent has been found valuable,⁴ especially when administered at the beginning of the increased secretion. When the ptyalism has proceeded to a greater extent, Trusen uses, at the same time, sulphureous baths. A colutury of the chloride of lime not only diminishes the excessive secretion from the salivary glands, but speedily mitigates the sense of burning in the mouth; induces the healing of the erosions of the mucous membrane, and corrects the mercurial fætor. In such cases, we have frequently employed it and with advantage, although the affection is not much under the control of medicine.

In offensive odours from the mouth, arising from carious teeth, Regnard employed a solution of the chloride, but it excited the

¹ Gazette Médicale, Mars 21, 1835. See also Bulletin Général de Thérapeutique, Juillet, 1838.

² Lancet, April 6th, 1833.

³ Gazette Médicale, Oct. 31, 1835.

⁴ Elliotson, in Mr. Houlton's Appendix to translation of Magendie's Formulary. Amer. edit. p. 162. Philad. 1834.

salivary glands in a disagreeable manner. On the other hand, E. Gräfe recommends it strongly in this very case, and even in caries itself, both inwardly and externally as a collutory and tooth powder. In the latter form it is said to remove speedily the tartar and yellow depositions on the teeth. By Chevallier and Kluge the chloride is strongly recommended for cleansing the mouth. The latter gives a formula for a collutory, which will be found amongst the prescriptions at the end of this article. It effectually cleanses the mouth, whilst it does no injury to the enamel.

In scarlatina, a solution of the chloride may be employed most advantageously as a gargle, and in the form of ablution to the surface.¹

In scrofulous swellings of the glands, the chloride of lime, according to Cima, may be applied with advantage in the form of ointment, and by Gräfe it is recommended in swellings of the joints. It has likewise been used successfully by Werneck in g $\ddot{o}$ tre.

In several chronic eruptions, it has been much extolled—as in herpes, by Kopp; in the itch, by Heiberg, Derheims,² Cluzel, Fantonetti,³ Hospital,⁴ and Wittzack⁵; in pruritus pudendi muliebris, by Darling; and in tinea, by Trusen, Roche, Cottureau, Kopp and Ebermeier. In the last disease, it is applied in the form of liniment; in the others, in solution, but in the itch often also in the form of ointment. Michaelsen recommends the following method of treating the itch. Take of the chloride of lime from two to four ounces, according to the degree in which the disease exists, and the length of time it has been in the system; put this in a common flask or bottle full of rain or river water, so that as much as possible may be dissolved. In using it, the patient must shake the bottle well, in order that some of the undissolved lime may be taken up. With this, he washes the parts affected with the itch three or four times a day. Every third or fourth day, when the skin becomes somewhat rough or irritated, the patient is made to take a tepid bath, or to wash himself with warm soap and

¹ Dr. Copland, in the Appendix to Houlton's edition of Magendie's Formulary, p. 163. Dr. S. Jackson, of Northumberland, (now of Philadelphia,) in Amer. Journal of Med. Sciences, xii. 261 and 550, and Ibid. for May, 1838, p. 56. (Dr. J. uses the chloride of soda.)

² Journal de Chimie M $\acute{e}$ dicale, ii. 575.

³ Bulletin de Th $\acute{e}$ rapeutique, 1833, and American Journal of the Medical Sciences, August, 1833, p. 533.

⁴ Amer. Journal of the Medical Sciences, Nov. 1834, p. 240, (extracted).

⁵ Casper's Wochenschrift, Feb. 4, 1837, S. 79.

water, and this until the cure is accomplished. The internal management is the same as in other plans of treatment. In the case of young children, the mixture must of course be weaker, about one ounce to a pound of water. By this plan, the patient, it is said, is entirely cured, without any unpleasant concomitants, in from seven to ten days.

The chloride of lime has likewise been applied in purulent ophthalmia. Varlez¹ cured contagious blennorrhœa of the eye, by dropping upon it a solution of the chloride. Colson, Delatte, and Reynaud,² also saw good effects from it, both in acute purulent ophthalmia, and in chronic ophthalmia with granulations, obscurity of the cornea, and especially in copious secretion from the meibomian glands. Guthrie³ applied a solution of the chloride successfully in three cases of ophthalmia neonatorum; and Pereira⁴ advises a weak solution in the same cases. Farvagnié used it beneficially in scrophulous and catarrhal ophthalmia.⁵

The chloride has likewise been employed advantageously in other blennorrhœas besides the one mentioned, and especially in the gonorrhœal.⁶ Gräfe, of Berlin,⁷ affirms that he succeeded with it when copaiba and cubebs had failed. He used it both in the form of pill, made as described hereafter, and of injection—the injection being made by dissolving gr. xxiv. in ℥vj. of water, and adding ʒss. of wine of opium.

But one of the most important of the applications of the chloride is as an antiseptic and disinfecting agent.⁸ It is admirably adapted for preventing and checking putrefaction, and for correcting the offensive odour of parts already putrefied:⁹ and hence its application is most useful in anatomical investigations.¹⁰ Some time before dissection, the body may be enveloped in a cloth wetted with a

¹ American Journal of Med. Sciences, i. 459.

² Journal für Chirurgie, u. s. w. B. xiv. H. 4.

³ Medical and Physical Journal, Nov. 1827.

⁴ Elements of the Mat. Med. pt. i. p. 354. London, 1839.

⁵ Verhandlung der vereinig. ärztlich. Gesellschaft der Schweiz. Jahr 1829. Zurich, 1830.

⁶ Alcock, Essay on the use of Chlorurets, &c. London, 1827.

⁷ Amer. Journal of Medical Sciences, and Amer. Journal of Pharmacy, 2d series, vol. ii. 86. Philadelphia, 1838.

⁸ Labarraque, on the use of the Chlorides of Soda and Lime, translated by Jacob Porter. New Haven, 1829.

⁹ Alcock, Op. cit.

¹⁰ Magendie, Formulaire, &c.

solution of the chloride, which must be kept wet by sprinkling it from time to time with a solution made of $\mathfrak{z}\text{j}$. of the chloride to a pint of water; in this manner the offensive odour is speedily corrected. The chloride is equally well adapted for purifying the air of the wards of hospitals, jails, ships; a little of the solution being sprinkled from time to time on the floors; or shallow vessels, containing the chloride, being placed in different parts of the room. It is used, moreover, for neutralising contagious miasmata dispersed in the air or contained in clothing, furniture, &c. care being taken in all these cases that due ventilation be practised.

It has been doubted, however,¹ and even denied, that its use is productive of any advantage in preventing the spread of infectious, contagious, or epidemic diseases. Nay, it has been affirmed to be positively injurious, by deteriorating the atmosphere, and in this there may be truth, unless the precautions we have mentioned be taken. In various cases, in which such diseases have prevailed, it has destroyed all offensive odour, but the extension of the malady has not been prevented.

MODE OF ADMINISTERING.

The chloride of lime has been given internally both in the form of solution and of troches, the dose being from gr. j. to grs. vj. four to six times a day. Externally, it is generally applied in solution of different strengths, (from $\mathfrak{z}\text{j}$. to $\mathfrak{z}\text{iv}$. to eight ounces of water)—the solution being decanted to remove the particles of lime from it, unless where it is considered advisable to employ the turbid solution.

In cases of very offensive evacuations from the bowels, ten or fifteen grains may be added to a common enema. It is likewise applied in the form of ointment and liniment, and also of a paste made by admixture with water.

¹ Observations on the chlorides and chlorine as “disinfecting agents,” and as preventives of cholera. By H. Bronson, M. D. Boston, 1832. See, also, American Journal of the Medical Sciences, for Feb. 1833, p. 481; Dr. Albers, in London Med. Gaz. viii. 410, as to its inefficacy in cholera; and Pereira, Op. cit. p. 352. London, 1839.

The following forms have been given for its administration.¹

Trochisci Calcis Chloridi.

Lozenges of Chloride of Lime.

- ℞. Calcis chlorid. ℥ij.
 Sacchar. alb. ℥viiij.
 Amyl. ℥j.
 Gum tragac. ℥j.
 Carmin. grs. iij.
 M. Fiant trochisci. pond. gr. iij.

One of these to be taken three or four times a day, and allowed to dissolve in the mouth, in cases of fœtor oris.

DESCHAMPS.

Mistura Calcis Chloridi.

Mixture of Chloride of Lime.

- ℞. Calcis chlorid. ℥j.
 Emuls. amygd. ℥vij.
 Syrup. gummos. ℥j. M.

A table-spoonful every three hours in gonorrhœa.

E. GRAEFE.²

Pilulæ Calcis Chloridi.

Pills of Chloride of Lime.

- ℞. Calcis chlorid. ℥j.
 Ext. opii, gr. ix.
 Mucilag. gum. arab. q. s.
 Divide in pilulas liv.

Dose.—One every two or three hours in gonorrhœa, gradually increasing the dose until eight, ten, or twelve are taken every hour.

GRAEFE.

Collutorium Calcis Chloridi.

Collutory of Chloride of Lime.

- ℞. Calcis chlorid. grs. xv. ad ℥ss.
 Mucil. gum. arab. ℥j.
 Syrup. cort. aurant. ℥ss. M.

¹ Riecke, Op. cit. S. 94.

² Journal für Chirurgie, u. s. w. B. xiv. St. 2.

A little of this solution to be applied by means of a mop of charpie to ulcers in the mouth. ANGELOT.

℞. Calcis chlorid. ℥iij.
 Aquæ distillat.
 Alcohol, aa. ℥ij.
 Ol. rosar. gtt. iv.

Solve et filtra.

CHEVALLIER.

A tea-spoonful of this solution is mixed with a glass of water, and used in fœtor oris. According to Riecke,¹ an analogous nostrum has been sold at a high price under the name—*Pneumokatharterion*.

℞. Calcis chlorid. ℥j.
 Solve leniter terendo in
 Aquæ distillat. ℥vi.
 Tunc adde

Alcohol. puriss. (.830) pond. spec. ℥viiij.

Mist. reponatur in loco frigido per horas xxiv; tunc filtretur et reserv. in lagena bene obturata. ("Let the mixture be put aside in a cold place for twenty-four hours; then let it be filtered and kept in a well stopped vessel.")

It has been recommended that the mouth should be rinsed with this after the teeth have been brushed. FREYBERG VON KLUGE.

The Pharmacopœia of Sweden has an *antiscorbutic collutory*, called *Linctus ad stomacacen seu oxymuriatis calcici*, which is formed as follows:

℞. Solut. calcis chlorid. ℥ss.
 Aquæ fontan.
 Mellis, aa. ℥vj. M.

℞. Calcis chlorid. ℥ss.
 Solve exactiss. trituratione in
 Aq. fontan. ℥ij.
 Et post limpid. clarificat. admisce
 Alcoholis, ℥ij.
 Ol. rosar. gtt. iv. M.

The mouth is rinsed in cases of salivation with a mixture made by adding a tea-spoonful of the solution to a glass of water.

TRUSEN.

¹ Op. cit. S. 94.

Solutio Calcis Chloridi.

Solution of Chloride of Lime.

℞. Calcis chlorid. ℥ij.
 Solve in
 Aquæ distill. ℥j.
 Adde
 Tinct. opii crocat.
 vel Vini opii, ℥j ad ℥ij. M.

Applied to frost-bites. TRUSEN.

℞. Calcis chlorid. ℥ss.
 Tere invicem et sensim affunde
 Aq. font. (seu rosar.) ℥j.
 Et post clarificat. limpid. admisce
 Mucil. gum. arab. (seu sem. cydon.) ℥ij.

Applied by means of linen rags in cases of burns. TRUSEN.

℞. Calcis chlorid. ℥ij. ad ℥ij.
 Aquæ. ℥i. Solve.

To be applied by means of rags kept constantly wet, in cases of hospital gangrene; the mixture being shaken.

RUST and KLUGE.

The *disinfecting liquor of Labarraque*, *Liqueur désinfectante de Labarraque*, is made by adding ten parts of water, to one part of the chloride of lime divided in a mortar; suffering the solution to settle, and then filtering.

Collyrium Calcis Chloridi.

Collyrium of Chloride of Lime.

℞. Calcis chlorid. gr. iv. ad vj.
 Laudan. liquid. Sydenham. ℥ss.
 Mucilag. gum. arab. ℥iss.
 Aq. rosar. ℥ij. M. et filtra.

To be dropped in the eye in cases of catarrhal and scrofulous ophthalmia.

FARVAGNIE.

Cataplasma Calcis Chloridi.

Cataplasma of Chloride of Lime.

- ℞. Calcis chlorid.
 Sodæ muriat. aa. ℥ss.
 Aquæ distill. ℔ss.
 Farinæ sem. lin. q. s. ut fiat cataplasma.

Used in cases of scrofulous swelling of the joints. GRAEFE.

Unguentum Calcis Chloridi.

Ointment of Chloride of Lime.

- ℞. Calcis chlorid. ℥j.
 Axungiæ, ℥j. M. fiat unguentum.

To be rubbed in, in cases of scrofulous swellings. CIMA.

- ℞. Calcis chlorid. ℥ss.
 Axung. porcine. ℥j. M. F. unguent.

Used in goître. WERNECK.

- ℞. Axung. ℥j.
 Boracis venet.
 Calcis chlorid. aa. ℥j. M. exactissimè.

In cases of chilblains. TRUSEN.

- ℞. Flor. sulphuris, ℥iss.
 Calcis chlorid. bene trit. ℥ij.
 Axungiæ, ℥x. M.

In itch, morning and evening. HOSPITAL.

Linimentum Calcis Chloridum.

Liniment of Chloride of Lime.

- ℞. Calcis chlorid. ℥ss.
 Tere in mortario vitreo et sensim affunde
 Aq. rosar. (seu fontanæ,) ℥j.
 Et post. limpid. clarificat. admisce
 Ol. amygd. dulc. ℥j.

To be applied by means of a pencil in cases of tinea capitis.
 TRUSEN.

CALENDULA OFFICINALIS.

SYNONYMES. *Calendula Sativa*, *Caltha Sativa*, *Verrucaria*, *Crysanthemum*, *Sponsa Solis*, Single Marigold, Garden Marigold.

French. Souci, S. Ordinaire.

German. Ringelblume.

This plant belongs to the family *Synanthereæ*, and in the Linnæan system to *Syngenesia necessaria*. It is much cultivated in the gardens of southern Europe more especially, and grows wild there. The whole plant has a feeble aromatic smell, which is not, however, unpleasant. The taste is bitter and somewhat pungent. It was examined chemically by Geiger and Stoltze,¹ who found in it a peculiar glutinous matter, readily soluble in spirit of wine; insoluble in ether, and in ethereal or volatile oils, and but little soluble in water; to this they gave the name *calenduline*.

EFFECTS ON THE ECONOMY.

The term *officinalis* indicates, that the calendula was formerly received into the lists of the *Materia Medica* as an "official;" but it had become entirely obsolete, when Westring,² a Swedish physician, in 1817, recalled attention to it. He recommended it particularly in cases of cancer of the breast and uterus, having noticed its good effects by accident. Visiting an aged female, who had suffered, for a long time, under an extremely painful induration of one mamma, he found she was able to allay the burning pain by the application of the fresh plant.

This induced him to try it in several cases of cancer, and from the results he was led to infer, that it is perhaps the best agent that can be employed in that frightful malady. He never, however, employed the calendula alone, but associated with it other active remedies, so that but little attention was paid to his recommendation;—a great portion of the efficacy of the agents employed, being—it was thought probable—ascrivable to the associated articles.

Some time after Westring's publication, the remedy was used by others, and his observations were confirmed. Rudolph³ employed

¹ Berlin. Jahrb. d. Pharmac. B. xxi. S. 282.

² Erfahrung über die Heilung der Krebsgeschwüre, u. s. w. Translated from the Swedish into German by K. Sprengel. Hal. 1817.

³ Hufeland und Osann's Jour. der prakt. Heilk. B. lviii. St. 1. S. 119.

it with advantage internally, in a case of induration of the mammæ in a young female; but the acetate of iron was at the same time applied externally in solution. Fehr¹ found it highly useful not only in incipient, but in advanced, scirrhus. Stein praises it in cancer of the integuments (*hautkrebs*). He forms the expressed juice of the young plant and flowers into an ointment with fresh butter, and applies it once or twice a day by means of lint, having previously washed the ulcers with a decoction of the plant. Internally, the calendula is prescribed in the form of decoction, made with milk or water, or of a mellago prepared from the fresh juice, dissolved in an aromatic water; or made into pills. When the salve is applied, a sense of burning arises, which soon becomes absolute pain. This soon, however, abates; and almost wholly disappears,—if too violent, more butter may be added; the ichorous discharge becomes improved; the offensive odour corrected, and in from fourteen to twenty-one days, the ulcer is converted into one of a benign and readily cicatrizable character.

Rust also frequently administered the *extractum calendulæ* in cancerous ulcers and as a discutient in chronic indurations, in combination, however, with other efficacious agents. Schneider affirms, that he prescribed the extract of calendula with the best effects in induration of the stomach, and in tumefaction and decided induration of the glands and uterus. A decoction of the flowers and plant, he employed in cancer of the uterus, and found it an excellent soothing, and discutient agent. Muhrbeck² used the extract with eminent success in chronic vomiting; Carter³ in extremely obstinate vomiting; and De Camp in a case of cardialgia, where the excitability of the stomach was so great, that every remedial agent was rejected before it had opportunity to act. Fehr also extols it as an emmenagogue, for which property it was celebrated with the older physicians.

As Riecke⁴ has remarked, the amount of experience with the calendula is yet small—too small for us to pronounce whether it merits a fixed place in the lists of the *materia medica*.

¹ *Verhandlungen der verein. ärztlich. Gesellschaft. der Schweiz.* Jahrg. 1831, and Dierbach, in *Heidelberger Annalen*, B. x. H. 4. S. 501. Heidelberg, 1834.

² Hufeland's *Journal der prakt. Heilk.* B. lxii. St. 5, S. 128. Rust's *Magazin. der gesamt. Heilk.* B. xi. S. 350.

³ *London Med. Rep.* April, 1826, p. 347. See, also, Link and Osann, in *art. Calendula* in *Encyc. Wörterb. u. s. w. B.* vi. S. 520. Berl. 1831.

⁴ *Op. cit.* S. 101.

METHOD OF ADMINISTERING.

The extractum calendulæ is contained in the Hannoverian and Saxon Pharmacopœias; in the latter it is directed to be prepared in the following manner:

Take of the calendula officinalis, 1 part.
Water, 8 parts.

Macerate for twenty-four hours; then boil for a quarter of an hour, and strain forcibly; boil the remainder with four parts of water; mix the two liquors, and, after twenty-four hours' rest, evaporate to the proper consistence.¹

The dose of the extract is different according to different observers. Muhrbeck gave four grains, five times a day. Fehr allows, ℥ij. to ℥vj. Phœbus directs the dose of the extract, prepared according to the Prussian Pharmacopœia, to be eight to sixteen grains, gradually increasing it to ℥ss. and more, from two to four times a day. It may be given either in the form of pill or mixture. Externally, the extract is used in solution, to moisten the dressings of ulcers, and to form ointments.

The dose of the decoction of the fresh plant is ℥j. to ℥ij.

The Sardinian Pharmacopœia has a *conserva florum calendulæ*, made by beating together one part of the flowers and two parts of powdered sugar. It has, also, an *acetum florum calendulæ*, made of one part of the petals digested in four parts of vinegar; and the Wirtemberg Pharmacopœia has an *unguentum florum calendulæ*, made of four ounces of the petals boiled in a pound of fresh butter, until the mixture is entirely evaporated. This is used as an emollient and resolvent.

Pilulæ Calendulæ.

Pills of Calendula.

℞ Ferri oxydat. fusc.
Herb. calend. pulv.
Extract. calend. aa. ℥j.

Mucilag. gum. arab. q. s. ut fiant pilulæ xc.

Dose.—Five to eight three times a day, as a soothing agent in cancerous ulcers.

Rust.

¹ Pharmacopée Universelle, &c. par Jourdan, ii. 536.

℞. Hydrarg. submuriat. ℥ss.
 Sulphur. aur. antim. ℥j.
 Extr. calendul.
 — conii macul. aa. ℥ij. M. f. pil. pond. gr. ij.

Dose.—Five pills, three times a day, as a discutient in chronic indurations. Rust.

Lotio Extracti Calendulæ.

Lotion of the Extract of Calendula.

℞. Extract. calend.
 ——— cham. vulg. aa. ℥ij.
 Solve in Aq. lauroceras. ℥ij.
 Adde
 Tinct. opii simpl. ℥j.

As a wash (Verbandwasser) in cancerous ulcerations. Rust.

It is obvious that the precise agency of the calendula cannot be tested in any of these formulæ, the substances associated with it being themselves active agents. In this country, we do not believe it is ever used.

CARBO ANIMALIS.

SYNONYMES.—Carbo Carnis, Animal Charcoal.

French.—Charbon animal.

German.—Thierische Kohle ; Fleischkohle, Thierkohle.

Animal charcoal is an ancient remedy, which has been revived amongst us. The older physicians used several kinds, and recommended them in various diseases, but without having any fixed principle ; the circumstances, indeed, that suggested their exhibition in many cases, are entirely unintelligible to us of the present day. In the old Wirtemberg Pharmacopœia, we find the *Erinaceus combustus*, or “burnt hedgehog,” as an antihydrotic ; the *Sericum tostum*, or “burnt silk,” and the *Hirundines combustæ*, or “burnt swallows,” as antiepileptics ; the *Lepus combustus*, or “burnt hare,” as an antilithic ; the *Reguli usti*, or “burnt wrens,” advised in nephritis and in calculous affections ; and the *Talpæ combustæ*, or “burnt moles,” at one time much extolled in erratic gout, lepra, scrofula, ulcers and fistulæ ! All have properly fallen, however,

into oblivion with the profession, although there may yet be some, who cling with pertinacity to these relics of ancient ignorance and superstition. The cancer remedy of Cosme, into the composition of which burnt shoe soles entered, appears to have kept up the employment of animal charcoal; as well as the "burnt sponge," *Spongia usta*, in which, however, the charcoal is of but little efficacy compared with the iodine it contains. These were perhaps the only forms in which animal charcoal was used at the time when Weise, a German physician, revived its employment; and many physicians soon came forward to attest favourably in regard to it.

METHOD OF PREPARING.

Weise gives the following method of preparing it. Cut ribs of veal, with the flesh attached, into small pieces, and put them in a drum for roasting coffee,—turning the drum constantly whilst it is placed over the fire. When inflammable air begins to pass off, which is distinguished by the flame playing around the drum, the combustion must still be kept up a quarter of an hour longer. If it be continued so long as any inflammable air is disengaged, the preparation is inefficacious. The substance, most commonly met with under the name of animal charcoal, is obtained by burning bones. The residue, when reduced to powder, is the well known substance *bone black* or *ivory black*.¹ This generally contains more or less phosphate of lime according to the kind of bone from which it has been procured. This is directed in the London Pharmacopœia to be purified by digestion in dilute hydrochloric acid as follows: "Take of animal charcoal, a pound; hydrochloric acid and water, each twelve fluid ounces. Mix the hydrochloric acid with the water, and gradually pour it upon the charcoal; then digest for two days in a gentle heat, occasionally agitating. Set aside, and pour off the supernatant liquor; then wash the charcoal with repeated portions of water, till no traces of acid are perceptible; lastly, dry it."² Charcoal, prepared in this way, should be a combination of carbon, carbonate and phosphate of lime, hydrogen, and azote. From an analysis, which Meurer made of animal charcoal, prepared according to Weise's formula, it contains also muriate and a little carbonate of soda, as well as a portion of iron.

¹ See Art. Carbo Animalis, by Dr. F. Bache, in Wood and Bache's Dispensatory, 3d edition, p. 161.

² Brande, Dictionary of Materia Medica, p. 151. London, 1839.

EFFECTS ON THE ECONOMY.

In the case of a young man of scrofulous diathesis, Weise saw a tumour, of the size of a hazelnut, and very painful, situate under the nipple, disappear under the use of animal charcoal. According to him, its efficacy is strongly exerted on the uterus and mammæ. Rothamel and Hohnbaum extol it in dyspepsia and gastricism, as well as in cases of diarrhœa. In obstinate chronic glandular indurations, especially of the mammary glands, Weise affirms it to be a certain remedy; he, at the same time, however, considers a regulated diet to be indispensable. Scirrhus of the lips, he says, also disappears under its use, and even scirrhus goître when the charcoal is associated with burnt sponge. On cartilaginous polypi, it is said to have exerted a beneficial agency, and to have diminished the tendency of mucous polypi to return after operation. Even open cancer, it is asserted, has been healed by it.¹ On these recommendations of Weise, animal charcoal has been used by several German physicians, especially by Wagner, Kopp, Pitschaft, Radius, Rothamel, Hesselbach, Gumpert, Hohnbaum, Fricke, Michaelsen, and Siebenhaar; and as a general result of their observations it would seem not to be devoid of therapeutical agency; although many of the experimenters failed in noticing any sanative effect from it. Fricke, for example, did not observe the least benefit in the very cases mentioned by Weise. He gave it also in the way of experiment, in several other cases, but without detecting the slightest influence on the organism. Other physicians saw advantages from its use in open cancer, but these were only transient. On the other hand, the experience of Wagner, Kopp, Michaelsen, and Rothamel would seem to show, that it was effectual in removing incipient scirrhus of the mammæ. Kopp employed it successfully in scirrhus goître, and Pitschaft in a case of what he terms *struma varicosa*. Radius dispersed under its use a considerable swelling of the submaxillary glands. In scrofulous affections, especially in scrofulous indurations of the glands, it proved useful in the hands of Kopp, Rothamel and Speranza. Pitschaft, in a delicate, strumous woman, who was suffering constantly under ozæna, found it of eminent service after other remedies had failed. Radius thought it aided the absorption of a disintegrated cataract, and Siebenhaar saw good effects from it in induration of the pancreas.

¹ Riecke, Die neuern Arzneimittel, u. s. w. S. 104.

Riecke¹ suggests, that further trials might show that it might be used in the place of iodine, which it appears to resemble in its action on the economy, whilst it affects the organism less injuriously. It is extremely doubtful, however, whether the properties of the two substances can be regarded as at all analogous, and whether the charcoal is possessed of any other properties than those usually ascribed to the prepared charcoal.

MODE OF ADMINISTERING.

The carbo animalis is given in doses of from half a grain to three grains twice a day, commonly in the form of powder with sugar, or with powdered liquorice root. Weise advises it to be sprinkled on the hard edges of cancerous ulcers, and Speranza extols an ointment made of charcoal and oil or simple cerate as a discutient in scrofulous swellings.

Pulvis Carbonis Animalis.

Powder of Animal Charcoal.

℞. Carbon. animal. gr. ij.
Pulv. rad. glycyrr. gr. v.

F. pulvis.

A powder to be given morning and evening.

℞. Carbon. animal. gr. vi.
Spong. marin. ust. gr. xij.
Pulv. rad. glycyrrhiz. ℥ss.
M. F. pulv. in partes vi æquales dividendus.

A powder to be taken night and morning in scirrhus goître.

RIECKE.

℞. Pulv. carbonis animal. gr. iv.
Pulv. rad. glycyrrh. ℥iv. M. et divide in part. viij.

One of these to be taken dry, morning and evening, a little water being drunk afterwards, in cases of scirrhus indurations of the mammæ. After the eight powders have been taken, the dose may be increased gradually by half a grain, until it ultimately attains four grains. At the same time, abirritating and spare diet should be inculcated.

¹ Op. cit.

Boli Carbonis Animalis.

Boluses of Animal Charcoal.

- ℞. Pulv. carbon. animal. gr. iij.
 Ammon. muriat. pulv. ℥j.
 Ext. conii macul. gr. ij.
 — glycyrrhiz. q. s. ut fiat bolus.

One of these to be given three times a day ;—in cases of swelling and scirrhus of the prostate, and of the mucous membrane of the urethra.

MAGENDIE.

CARBONIS SESQUI-IODIDUM.

SYNONYMES. Carbonis Sesqui-ioduretum, Sesqui-iodide or Sesqui-ioduret of Carbon.

This preparation is made by mixing concentrated alcoholic solutions of iodine and potassa until the former loses its colour. A solution is obtained, from which the addition of water will throw down a yellow precipitate—the sesqui-iodide of carbon.

This substance is soluble in alcohol and ether, but insoluble in water. The ethereal solution yields large yellow crystals by slow evaporation. It has a sweet taste, and a strong saffron-like odour. Mitscherlich¹ considers the taste very disagreeable.

Fifty grains given by Dr. Cogswell,² to a strongly made terrier dog, proved fatal ; and, on dissection, the large vessels were found congested ; the inner membrane was closely corrugated, and the apices of the rugæ were of a rose red colour.

EFFECTS ON THE ECONOMY IN DISEASE.

Dr. Litchfield³ used it with advantage in five cases of enlarged glands ; in two of lepra, and three of porrigo, in the form of ointment composed of ʒss of the powder to ʒvj of simple cerate.

¹ *Traité de Chimie*, traduit par Valerius.

² *Essay on Iodine*, p. 122. Edinb. 1837.

³ *Lond. Med. Gaz.* Aug. 1836.

CETRARINA.

SYNONYMES. Cetraria, Cetrarine.

French.—Cetrarin.

This substance has been extracted, of late, from the lichen islandicus or cetraria islandica, by M. Herberger, a pharmacien at Kaiserslautern.¹

METHOD OF PREPARING.

The coarse powder of the lichen is boiled for half an hour in four times its weight of alcohol at .883; it is left at rest until vapours cease to be given off, to avoid the loss of the alcohol; it is then strained and pressed. Three drams of hydrochloric acid previously diluted with water are now added to each pound of the lichen; this is mixed with from four times and a quarter to four times and a half its bulk of water, and the mixture is left at rest for a night in a closed flask. The next day, the deep yellow fluid, which swims above the copious deposit obtained, is poured off: this deposit is the impure cetrarine, the colour of which is more or less greenish. It is now collected on a filter (*chausse*), left to drain as little as possible and subjected to pressure. To purify it, it must be divided into small fragments, and washed whilst still moist with alcohol or ether, which deprives it of colour; it is then treated with two hundred times its weight of boiling alcohol, in which the inorganic matter, which has hitherto accompanied it, is scarcely soluble. The greater part of the cetrarine is gradually precipitated on the cooling of the alcoholic solution. The portion which still remains in solution, may be separated by the evaporation of the alcohol.

Pure cetrarine is at times in the state of a white powder, resembling magnesia; at others in small globules united in the form of arborisations, which do not present—even under the microscope—any crystalline texture. When gently compressed, it has a slight silky splendour. It is light, unalterable in the air, inodorous, and has a very intense bitter taste, especially in the alcoholic solution. Its best solvent is absolute alcohol, one hundred parts dissolving 1.70 of it at the boiling temperature, but only 0.28 at 14° centig.

¹ Buchner's Repertorium, B. viii. H. 1. 1837.

(58° Fahr.) Alcohol, at 0.830 dissolves 0.44 when boiling, 0.28 at 25° cent. (77° Fahr.) and only 0.04 at 14° cent. (58° Fahr.) It is still less soluble in boiling and in cold water, the essential oils, creosote, &c. It is somewhat more soluble in ether, but insoluble in the fixed oils.¹

EFFECTS ON THE ECONOMY IN DISEASE.

M. Müller, a physician of Kaiserslautern,² details two cases in which he has administered the cetrarine. One of these was a quartan, the other a tertian intermittent. The effects appeared to be exerted more slowly than those of quinine, but it seemed to him not to affect the stomach as much.[?] Its price must be much less, as M. Herberger succeeded in obtaining from a pound of lichen 135 grains of very pure cetrarine.

It has not been given, so far as we know, in this country.

METHOD OF ADMINISTERING.

Müller gave it in the form of powder according to the following prescription :—

℞: Cetrarin.
Gummi arabic. aa. gr. ij.
Sacchar. alb. ℥ss. M. et fiat pulvis.

Dose.—One of these every two hours during the apyrexia.

H. Bruck,³ suggests, that if dissolved in spirit of wine, its action may be incomparably more potent, and that it may more speedily arrest the paroxysms of an intermittent than when given in powder.

¹ Journal de Pharmacie, xxiii, 505, Paris, 1837, and Bulletin Général de Thérapeutique, No. 18, Sep. 30, 1837.

² H. Bruck, in Bulletin Général de Thérapeutique, No. 17. Sep. 15, 1837.

³ Op. cit.

CHIMAPHILA (FOLIA.)

SYNONYMES. *Chimaphilæ vel Chimophilæ Umbellatæ Folia*; *Pyrolæ Umbellatæ Folia*, Winter Green, Pipsissewa.

French.—Herbe à pisser, Pyrole en Ombelle.

German.—Die Blätter des holdenblühtigen Wintergrüns.

This plant is not new to us; but numerous trials have been made with it recently in Europe. It is admitted into the Pharmacopœia of the United States, is a beautiful evergreen, and is indigenous in the northern parts of Europe, Asia, and America. It belongs to the natural family of heaths, *Ericææ*; and, in the Linnæan System, to *Decandria Monogynia*. A good description of it is given by Barton.¹

The leaves have a bitter-sweetish taste, with some degree of astringency. The taste of the stems and roots is, in addition, considerably pungent. Boiling water and alcohol extract the virtues of the plant. The constituents, so far as ascertained, are bitter extractive, tannin, resin, gum, lignin and saline matters.

EFFECTS ON THE ECONOMY IN DISEASE.

The leaves of the *Chimaphila* were long used by the Indians of this continent, and from them the American physician was induced to employ them. The first regular treatise respecting the plant is said to have been a thesis of Dr. Mitchell, published in the year 1803.² In Canada it is said to have been long used in diseases of the urinary passages, especially in calculus, dropsy, and in chronic gout and rheumatism; its effects appearing to resemble—but not to exceed—those of the *uva ursi*. Somerville³ and Barton extol it as an excellent diuretic in different forms of dysuria, and in dropsies, especially such as succeed to acute diseases; in nephralgia as a palliative, especially when the paroxysms are occasioned by gravel which has accumulated in the kidney; and even in vesical calculus. During its use the appetite improved, and the digestive powers augmented; the patients often experiencing—immediately after it was taken—an agreeable sensation in the stomach, and in the region of the kidneys.

¹ Medical Botany, i, 17; see, also, Art. *Chimaphila*, in Wood & Bache's Dispensatory, 3d edit. p. 193.

² Barton's Collection, ii, 2.

³ Medico-chirurgical Transactions, v, 340.

Radius¹ found it especially serviceable in dropsy, gout and rheumatism; and in inordinate activity of the secretory function of the mucous membranes—chronic catarrh, phthisis pituitosa, &c. According to him, it is contraindicated where there is much fever, disposition to diarrhœa, gastricism, and great debility of the stomach. Heyfelder affirms, that the chimaphila appears to be advantageous in the debility of the digestive organs attendant upon dropsy, but its diuretic effect is not considerable or enduring, so that it requires to be associated with other more powerful agents.

Experiments, which have been made recently in the Bürgerhospital at Pesth, and which have been collected by St. Rochus and published by Windisch, the director of the hospital, are extremely favourable to the chimaphila. Within two years, nearly two hundred dropsical cases are said to have been radically cured by it. Windisch recommends it most strongly to the attention of his colleagues; he asserts it to be one of the best diuretics we possess; that it does not impair digestion; moderately accelerates the circulation; gently encourages the action of the bowels, and powerfully augments the urinary secretion; that the patients willingly take it, and that it induces no nausea. It was administered with advantage in dropsies unaccompanied by fever, and not dependent upon organic mischief, upon “corruption of the humours or paralysis of the lymphatic textures.” In febrile conditions and inflammatory diatheses, it is said to have been always injurious, as well as when it was administered prior to the resolution of obstructions remaining after long protracted intermittents; but when these are removed, and no excitement exists, more, according to Windisch, is to be expected from it than from any other agent, and he strongly advises, that careful trials should be made with it in the proper cases. He advises, also, that its use should be persevered in, in order that good effects may be derived from it.

We have frequently administered the chimaphila in public and private practice, and have found it serviceable, where a tonico-diuretic was indicated.

MODE OF ADMINISTERING.

The chimaphila is given either in infusion, or, what is preferable, in decoction; the dose in the day being from half an ounce to an

¹ Auserlesene Heilformeln zum Gebrauche für praktische Aërzte und Wundärzte, u. s. w. Leipz. 1836.

ounce. Where it does not act sufficiently on the bowels, Radius advises, that a few senna leaves should be added. In affections of the chest, he found the addition of the sweet spirit of nitre advantageous. Generally, however, he gave the chimaphila alone. Windisch found a combination of it with tartar emetic, liver of sulphur, sal ammoniac, squill, and, in very great weakness, cinchona and preparations of iron, serviceable. Radius often administered also the aqueous or spirituous extract.

Decoctum Chimaphilæ.

Decoction of Chimaphila.

℞. Chimaphil. umbellat. ℥j.

Macera per horas xij. in aquæ font. ℔ij. (℔iss Ph. Lond.)

Coque ad colatur. ℔j.

To be used daily in dropsy.

SOMERVILLE.

℞. Chimaphil. umbellat. ℥ss ad ℥j.

Coque cum aquæ font. ℥xij, ad reman. ℥vj.

Coctione finita adde

Spiritûs frumenti. (gin, malt spirit or whisky) ℥ij.

Digere frigidè per horas vj, et cola.

Dose—Two spoonfuls to be taken four times a day in dropsy and gout.

RADIUS.

℞. Chimaphil. umbellat. ℥vj.

Coque cum aq. font. ℥xij ad reman. ℥vj.

Sub finem coctionis adde

Fol. sennæ ℥ij, et cola.

Dose—A spoonful to be taken every two hours.

RADIUS.

CHLORINUM.

SYNONYMES. Chlorum, Chlorine, Murigene, Acidum Muriaticum Oxygenatum, Acidum Marinum Dephlogisticatum, Spiritus Salis Marini Dephlogisticatus.

French.—Chlore.

German.—Chlor, Chlorgas.

Uncombined chlorine is employed medicinally not only in the gaseous but liquid state. Of each of these we shall treat in succession.

The forms for evolving it in the gaseous state, as well as the gaseous chlorine itself, have had various names assigned them expressive of their chemical or medical properties. They have been termed, respectively, *Acidum muriaticum oxygenatum ad contagia*; *Fumigatio muriatico-oxygenata*; *Pulvis ad fumigationes muriaticus*; *Species pro vaporibus superoxydi muriatici*; *Suffitus oxymuriaticus*; *S. chlorini*; *Alexiterium Chloricum*, *Fumigation de chlor*, *F. de Guyton*, *F. Guytonienne*, *F. Hygiénique*, &c.

MODE OF PREPARING.

Chlorine is obtained from muriatic or hydrochloric acid. For this purpose, one part of well pulverised peroxide of manganese with five or six parts of concentrated muriatic acid is put into a retort, to which heat is applied and the gas received over water. Or, it may be obtained from a mixture of one part of manganese, four parts of kitchen salt, two parts of concentrated sulphuric acid, and four parts of water.

Chlorine is a greenish yellow gas; of a peculiar, strong, disagreeable, stifling odour. The flame of a lighted taper introduced into it becomes at first pale, afterwards red, and is ultimately extinguished. It remains unchanged in the highest temperatures. It has a great affinity for hydrogen, so that it abstracts this gas from every substance that contains it, and forms with it muriatic acid. Hence it decomposes all the gases that contain hydrogen, and all organic colouring matters, as well as—it is conceived by many—miasmata and contagious matters.

EFFECTS ON THE ECONOMY.

Chlorine when diluted, and received into the lungs, occasions coughing, and symptoms of suffocation, to which a protracted catarrh often succeeds; not unfrequently, too, we observe in those, who are compelled to be exposed to the gas, bronchitis and pneumonia. Animals soon die when they are immersed in it.¹

In Mr. Broughton's experiments, mice exposed to it fell dead in less than thirty seconds. On opening them, the heart was found palpitating; the peristaltic motion of the intestinal canal continued, and could be kept up by irritating it with a probe. The vessels of the brain were collapsed. The lungs were tinged with

¹ See Christison on Poisons, 3d edit. p. 736. Edinb. 1836.

the yellow colour of the gas, and the peculiar odour of chlorine was perceptible throughout their structure. Coagulation of the blood took place as under ordinary circumstances. A rabbit, two or three weeks old, was immersed in chlorine, and died in less than half a minute. On opening the thorax, the heart was found acting freely and on puncturing the aorta, the blood jetted out forcibly to a considerable distance. The peristaltic motion of the bowels was also going on. The vessels of the brain were in a collapsed state. The lungs were very much distended, tinged yellow, and when removed from the chest to a distance, emitted the odour of chlorine. The right ventricle of the heart was distended with dark blood. The eyes were much glazed in each experiment. "It has been generally thought," adds Mr. Broughton, "that chlorine is incapable of passing the epiglottis" (the glottis), "but from the above observations it is evident that this gas enters the bronchial tubes in the act of inspiration. A portion of it probably circulates through the brain, suspending the cerebral functions without directly destroying the action of the involuntary organs,—contractility remaining long after the destruction of animal life, as is evinced by the activity of the heart and of the intestinal canal."¹

These very facts, however, seem to show that but little of the gas enters the lungs; probably no more than what passes immediately preceding the closure of the glottis by the forcible contraction of the arytenoidei muscles. When inhaled in a dilute state, it is absorbed, and, according to Mr. Wallace, the urine acquires bleaching properties. It would appear also, that, in manufactories, the chief consequences, resulting from exposure to an atmosphere of chlorine, are acidity and other stomach complaints, which the men generally remove by taking chalk:² this fact is confirmatory of the view, that acidity of the stomach is usually, if not always, dependent upon excess in the secretion of the gastric acids, the most important of which is the hydrochloric. Where chlorine is inhaled, it is reasonable to suppose that more of the hydrochloric acid may be secreted in the stomach.

METHOD OF EMPLOYING.

1. *By inhalation.*—In the way of inhalation, chlorine gas is never administered in a state of purity, but always diluted with

¹ Journal of the Royal Institution, from Jan. to June, 1830.

² Pereira, Elements of Materia Medica, pt. i. p. 107. Lond. 1839.

atmospheric air; often, too, it is united with watery vapour. Gannal affirms that the workmen in a bleaching establishment, who suffered under diseases of the chest, were visibly improved, and ascribed the amelioration to the inhalation of air containing chlorine. He, therefore, instituted various experiments on consumptive individuals, from which good results, he conceived, followed. Sir James Murray¹ also mentions that a friend of his had observed similar effects among his workmen exposed to the inhalation of watery vapour strongly impregnated with chlorine.

The experiments, however, which were instituted at La Charité, in Paris, on this mode of treating phthisis, were by no means encouraging; and the same may be said of those at the Hôtel Dieu of that city, instituted by Rullier.²

In many cases, indeed, the disease appeared to be aggravated. Bayle likewise thought the inhalation of chlorine generally unfavourable, although he asserts that he cured a case of tubercular phthisis thereby. Recently, it has been again recommended by Cottureau.

Professor Albers,³ of Bonn, who administered it repeatedly, and carefully watched its effects, conceives that it acts as a stimulant when applied to the membrane, but that, when it gets into the blood, its effects are antiphlogistic; and he is of opinion that, when there is no hæmoptysis, or violent local irritation present, chlorine inhalations may be used in diseases of the lungs and air passages. Its stimulant effect gradually diminishes, and, after a time, the mucous surfaces of the lung become less sensible to its exciting influence. In tubercles of the lung, in chronic catarrh, in chronic inflammation and ulceration of the bronchial mucous membrane, and in dilatation of the bronchi, he found it of no service, and, in most cases, it could not be borne in consequence of the irritation it induced; but its operation was very salutary in pure ulceration of the lungs or vomica. It had always, however, to be administered cautiously and experimentally.

Dr. Stokes always found chlorine inhalations prejudicial in phthisis, producing, in every case, increase of bronchial irritation,

¹ A Dissertation on the Influence of Heat, &c., Lond. 1829; cited in the Dublin Journal of Medical Science, for March 1839, p. 96.

² See, also, Pereira, Elements of the Materia Medica, pt. i. p. 108. Lond. 1839.

³ Hannoversche Annalen, 1836, and Br. and For. Rev. for July, 1837, p. 215.

dyspepsia, and arrest of the pulmonary secretion. In his trials of the remedy in gangrene of the lungs,¹ he found it decidedly beneficial, correcting the fœtor of the breath and expectoration, and, therefore, calculated to obviate not only the local but the constitutional symptoms.

Sir James Clark² is of opinion that the inhalation of chlorine has only produced relief in persons whose lungs have been diseased to a very limited extent.

Dr. Pancoast informs the author, that a case of aphonia, occurring in a young lady, in which there was but little voluntary power over the diaphragm, was cured by the inhalation of chlorine, after the galvanic plates and the electro-magnetic apparatus had been used in vain.

The chlorine may be inhaled from a common dish or inhaling apparatus, by dropping any of the acids on a mixture of chloride of lime, so that the acid may be disengaged slowly, but the best method of inhaling it, as well as iodine, is that recently recommended by Dr. Corrigan.³ He properly remarks that, in order that inhalation may have a fair trial, it is requisite, *first*, That the apparatus should be simple in its construction, and easily kept in order. *Secondly*, That it should be capable of keeping up a supply of vapour for any length of time, and that the evolution of the vapour should be steady and easily regulated. *Thirdly*, That it should also furnish a sufficient supply of aqueous vapour to prevent any irritation of the larynx, or lining membrane of the air tubes; and, *fourthly*, and most important of all, that its employment should entail neither trouble nor fatigue on the invalid.

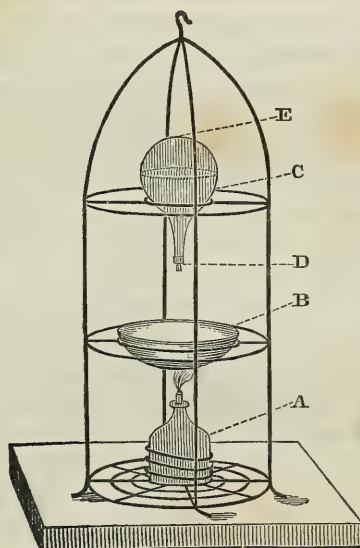
To fulfil these objects, Dr. Corrigan advises the apparatus represented in the following page. It consists of a light open iron-wire frame, about eighteen inches high, at the bottom of which is a spirit lamp, A: at the proper height above it is an evaporating porcelain dish, about six inches in diameter, B: above this is a glass globe, C, with its neck downwards. In the neck of the globe is a cork, D, bored, and through the opening is drawn, moderately tight, a short plug of cotton wick, such as is used in a spirit lamp: in the glass globe at E, opposite the neck, is drilled a pin-hole, to allow air to pass in, according as the fluid within

¹ Dublin Hospital Reports, vol. v.

² Treatise on Tubercular Phthisis, p. 84, Lond. 1834; also, Amer. edit. Philad. 1835.

³ Dublin Journal of Medical Science, March, 1839, p. 94.

drops out through the neck. To use it, the porcelain dish is filled with hot water, the spirit lamp is lighted, and as soon as the water in the dish has begun to boil, the glass globe containing the chlorine, (if this be the substance used,) is placed as shown in the marginal illustration. The rate, at which the fluid in the globe shall percolate the cotton wick and drop into the hot water beneath, is easily regulated. If it does not drop with sufficient rapidity, one or two of the threads of the cotton may be removed. If it drops too rapidly, this is corrected by pressing in the cork more tightly, or introducing one or two additional threads of wick.



In employing the chlorine, eight ounces of saturated solution of chloride of lime may be poured into the glass globe; and into the water of the porcelain dish, two ounces of the dilute sulphuric acid of the pharmacopœia. As the solution of the chloride drops, the acid seizes on the lime, and the chlorine is evolved in connection with aqueous vapour.¹

Chlorine is but little used in this form, and can only be adapted for cases in which the pathological condition of the bronchial mucous membrane, or neighbouring parts, requires the exhibition of an excitant.² In this way, it may be occasionally serviceable in chronic

¹ Lond. Med. Gazette, April 6, 1839, p. 49.

² Toulmouche, in *Revue Médicale*, Avril, 1834.

bronchitis; but its administration requires great caution.¹ In cases of poisoning by the hydrocyanic acid, as well as by sulphuretted hydrogen, chlorine is a most efficacious agent. The chloride of lime may be used for this purpose.

2. *By Fumigation.*—Fumigations of chlorine have been particularly recommended by Wallace, of Dublin.² They appear to resemble, in their action, the nitrous and nitro-muriatic acid baths, and have been especially employed in liver diseases, unaccompanied by inflammation, but in which there is disturbance of the biliary secretion. According to Wallace, fumigations of chlorine are more certain than ablutions and baths of nitro-muriatic acid, and they have the advantage, that their application subjects the patient to less inconvenience. The good effects of chlorine, in such cases, have likewise been tested by Zeise,³ in his bathing establishment at Altona. When the chlorine is, in this way, brought into contact with the skin, it soon occasions a pricking sensation; increase of transpiration; great afflux of fluids to the surface of the body, and sometimes a pustular eruption; increased secretion of saliva, urine, and bile; slight inflammation of the mouth and fauces, and impeded respiration and circulation.

Wallace found chlorine fumigations serviceable not only in hepatic diseases with disordered secretion of the liver, but in several other morbid conditions, as hypochondriasis, cachexia, and in all affections in which a prolonged excitation of the skin, and a restoration of its suppressed or impaired functions could be esteemed serviceable,—hence, in old cases of syphilis, scrofula, chronic catarrh, and rheumatism: generally, cathartics were combined with the fumigations, and the evacuations were constantly observed to present a highly bilious character.

In chronic cutaneous affections, as in lepra, psoriasis, and scabies, these fumigations have been found useful; but, generally, fumigations of sulphurous acid are employed by preference, in consequence of the greater facility with which they can be prepared.⁴

Injections of chlorine gas have been employed for the radical cure of hydrocele by M. Deblois, of Tournay, and M. Decondé.⁵

¹ Archives Générales, Avril, 1834; and a recent communication on the excellent effects of chlorine vapour in catarrh, in Gazette Médicale de Paris, June, 1838.

² Researches respecting the Medical Powers of Chlorine, &c. Lond. 1822.

³ Nye Hygea udgivet af C. Otto, 1825, and Hufeland und Osann's Journ. der prakt. Heilkund. B. lxiii. St. 1.

⁴ Green on Diseases of the Skin. American Library edit., Philada. 1838.

⁵ Bulletin Médical Belge, Janvier, 1836.

The chlorine gas is contained in a bladder, to which is attached a pipe and stopcock adapted to the canula of the trocar, into which it is fixed after the fluid is evacuated: the stopcock is then turned, and the bladder pressed so as to force the gas into the tunica vaginalis. When this is distended, the pipe and bladder are removed, and the thumb is placed over the mouth of the trocar, so as to prevent the issue of the gas for the space of two minutes: it is then allowed to escape, and two or three repetitions of the injection are made, which are sufficient for the cure. It would appear, that risk must be incurred from the injection of such an acrid substance, but M. Decondé says not.

Fumigations of chlorine, with the view of destroying the matter of contagion, and of preventing the spread of contagious diseases, have long been used.¹ As long ago as the year 1773, they were proposed by Guyton de Morveau, and hence they have been called the "Guytonian," or the "Guyton Morveau fumigations." They are the best agents for the purpose that we possess.

In fumigating the extensive general penitentiary at Milbank, Westminster, Dr. Faraday adopted the following method. One part of common salt was intimately mixed with one part of the black oxide of manganese; the mixture was placed in a shallow earthen pan, and two parts of oil of vitriol, previously diluted with two parts by measure of water, were poured upon it,—the whole being stirred with a stick. Chlorine was liberated for four days. The quantities of the ingredients employed were 700 pounds of common salt, the same quantity of the oxide of manganese, and 1400 pounds of sulphuric acid.²

When chlorine is evolved in the manner described, it is liable, like all the acid gases, to the objection that it is extremely irritating when respired. It cannot, therefore, be used in the sleeping apartments of the sick, although it may be employed beneficially after they have been withdrawn, and the object is to disinfect the chamber. It ruins all polished surfaces, but this can be effectually obviated by painting them over with a compost of starch. The chlorides are not liable to the same objection, as they exhale the chlorine slowly.³

¹ Link, Art. Chlor, in *Encyclopäd. Wörterb. der medicin. Wissenschaft.* B. vii. S. 575. Berlin, 1831.

² Pereira, *Op. cit.* p. 107.

³ See the author's *General Therapeutics*, p. 509. Philad. 1836.

CHLORINI AQUA.

SYNONYMES. Aqua Chlorinii, Liquor Chlorig, Aqua Chlorig, Aqua Oxymuriatica, Liquor Acidi Muriatici Oxygenati, Aqua Oxygenata Muriatica, Aqua Oxygeno-Muriatica, Liquor Alexitereus Oxygenatus, Solutio Alexiteria Oxygenata, Solution of Chlorine, Liquid Oxymuriatic Acid.

French.—Chlore Liquide, Eau de Chlore.

German.—Chlorwasser.

This preparation is contained in many of the pharmacopœias. It is in those of Austria and Anvers; and in the Batavian, Bavarian, Belgian, Danish, Dublin, Parisian, Finnish, Hannoverian, Polish, Prussian, and Swedish.¹ It has been more extensively administered on the continent of Europe than in this country, or in Great Britain.

METHOD OF PREPARING.

The Prussian Pharmacopœia directs chlorine gas, made after the manner before described, to be passed into the bottles of a Woulfe's apparatus filled with distilled water, until two-thirds of the water are displaced; the bottles are corked under water, and the water is agitated until it takes up the gas. The liquid is then drawn off into small bottles, which are well filled, and kept in a dark place. In this way, liquid chlorine may be kept for a long time undecomposed. In its preparation, some little muriatic acid is formed, so that it has at times to be purified by treating it with a solution of nitrate of silver.

EFFECTS ON THE ECONOMY IN HEALTH.

From experiments made by Orfila² on dogs, it appears that considerable doses of a moderately concentrated solution of chlorine prove fatal, by exciting sooner or later inflammation of the stomach, accompanied with great languor; and when death takes place very rapidly, signs of organic alteration are met with in the stomach. In its action on the economy, chlorine is closely allied to the acids, and especially to the muriatic. Introduced into the stomach in moderate doses, the solution of chlorine excites an agreeable feeling of warmth, which soon spreads over the whole of the body: in

¹ Pharmacopée Universelle, i. 405. Paris, 1828.

² Toxicologie Générale, i. 141.

strong doses, according to L. W. Sachs, a kind of intoxicating stupor is induced by it, soon succeeded by prostration. It has been conceived to act equably as a moderate excitant on the nervous system, and thereby to moderate inordinate action in any part, and is, to a certain extent, antiphlogistic, without possessing any of the debilitating qualities of the antiphlogistics proper. In the opinion of some of the German pathologists, it exerts a powerful stimulation on the organic actions, especially on the lymphatic and glandular systems, moderating inordinate secretion. Its antiseptic properties are likewise considerable. It would appear, however, that the number of observations has not been sufficiently great—although they have been by no means few—to allow of any comprehensive appreciation of its exact *modus operandi* on the human organism.¹

EFFECTS ON THE ECONOMY IN DISEASE.

Although the solution of chlorine is properly no new remedy, it is only of late years, that it has been frequently administered. At the present day in some countries, it is in common use. It is not long since Meurer maintained, that it is impossible to administer chlorine internally, and that in every case in which it was believed to have been given, the article really taken was the hydrochloric or muriatic acid; for, owing to the affinity of chlorine for hydrogen, whenever any union takes place between it and organic matters, the chlorine he affirmed disappears, and muriatic acid alone exists, as he had proved by repeated experiments. In this assertion, however, he was opposed by many observers. Herzog and Bärmann came forward with experiments to show that Meurer had gone too far in his deductions; and from all the experiments, it would appear, that in prescribing the *aqua chlorini* many mistakes had been, and—we may add—still are, committed. From Bärwald's experiments it would appear, that if water which has rested on aromatic or other vegetable substances be chosen for the dilution of the *aqua chlorini* instead of distilled water, a difference is produced in the rapidity of the decomposition. In a mixture of *aqua chlorini*, distilled water, and simple syrup, the decomposition takes place tardily; but if in the place of the syrup, a mucilaginous juice be substituted—for example, the *syrupus althææ*—acids are speedily formed; as well as when a decoction of *althæa* is substituted for distilled water;

¹ Riecke, *Die neuern Arzneimittel*, u. s. w. S. 30. Stuttgart, 1837.

whereas a mixture of the decoction of salep (gr. v to water 3j), syrup, and the aqua chlorini in well stopped bottles remained undecomposed above twenty-four hours. In these experiments, however, the persistence of the smell and taste of the chlorine exhibited, that the whole of the chlorine had not been converted into muriatic acid. In the same manner as in the case of the decoction of marshmallows, the addition of the infusum sennæ and infusum valerianæ, as well as of solutions of extracts, and especially of liquorice, destroyed the smell of the aqua chlorini instantaneously, even when the taste of chlorine could still be detected. When the solution was combined with remedial agents, that contain much colouring matter, the decomposition took place with great rapidity. From the results of these experiments, Bärwald advises the aqua chlorini to be given in admixture with distilled water and simple syrup, as in this way only can we be sure, that the patient has taken the chlorine undecomposed. Herzog lays it down as a rule, that the solution of chlorine should only be mixed with colourless transparent substances—water, simple syrup, gum arabic or the decoction of salep.

In respect to its administration in disease, we shall speak first of its internal use, which in several morbid conditions seems to have rendered good, and in some cases eminent, service. The following are the diseases in which it has been chiefly recommended.

1. *Irritative fever*, as in the violent irritative fever that occurs during the period of dentition; in which it has been administered with great success by Kopp, Mehlhausen, Göden, Trusen, and Riecke.¹ Dangerous determinations to the head have been, in this way obviated, along with the unpleasant complications which are apt to be occasioned thereby. Toël² exhibited it in convulsions, during dentition, which were accompanied by too great activity of vessels, and he affirms, that he has prescribed no remedy, which, in all respects, answered so well.

2. *Nervous fever*, especially when tending to the putrid character. In the plague, according to Wagner, it is of no avail; but in putrid fever, according to Kopp, it is highly useful. Spangenberg observed good effects from it in an epidemic typhus with hepatic derangement. It is likewise extolled in typhus by Wolf, Braun, Hufeland, and others; and by Sacco in the fever called petechial, itself a typhus. Of late, it has been much used in Germany in

¹ Op. cit. S. 30.

² Archiv. d. med. Erfahrung, März und April, 1825.

the typhus abdominalis, which corresponds to our typhoid fever, to oppose the origin and development of the intestinal ulcerations; but when the disease is farther advanced it has been found useless. It is especially recommended in this disease by Clemens, but he commonly premises the use of an emetic. Trusen considers the emetic unnecessary. He first applies leeches to the epigastrium, and then prescribes immediately the aqua oxymuriatica in considerable doses;—in lighter cases, a dram every two hours; and if the disorder of the head be already great, the tongue chapped (rissig), and the peculiar expression of countenance present, he gives two drams every two hours. Bartels is less satisfied with the action of chlorine in abdominal typhus. It raises, he says, the sinking powers very speedily, but often excites the sanguiferous system, and not unfrequently increases the abdominal symptoms so palpably, that the physician is compelled to have recourse to other agents. Riecke¹ thinks, however, that it may be of essential service in this disease, which so frequently mocks the best directed efforts of the practitioner; and he suggests, that farther experiments are highly desirable, especially as those instituted by Trusen and others are not free from objections, by reason of their having combined with the chlorine substances that quickly decompose it.

3. *Carbunculus malignus* (Milzbrandkarbunkel).—In the variety of malignant anthrax caused by handling the skins of cattle, the internal and external use of chlorine has been found of essential service by Ettmüller, Herbst, Stumpf, and Hoffmann.

4. *Scarlatina*.—Pfeufer, Wendt, Kopp, and Trusen extol it highly in this disease, for which, on theoretical grounds, it would seem to be appropriate, by reason of the great turmoil in the sanguiferous system, as indicated by rapidity of pulse and inordinate secretion of heat, bearing but little direct ratio to the degree of vital energy. Braithwaite, who, it is asserted, was one of the earliest, if not the earliest, who advised chlorine in scarlatina, supposed that it acted as specifically as the bark in intermittent, or mercury in syphilis; and Trusen asserts that it may be advantageously used in cases where other remedies have been found ineffectual. It is especially recommended by Braun and Spiritus in malignant scarlatina.

5. In other febrile exanthemata, small-pox, measles, rubeola, &c., it has been prescribed with advantage. In putrid dysentery, (faulige Ruhr,) it is extolled by Nysten and Kopp; and in intermittent, by Kopp and Kretschmar. Trusen recommends it

¹ Op. cit. S. 33.

in the irregular, and especially in the anticipating forms, where there is danger of their becoming continued. Under its use, he found the paroxysms became regular, with perfect apyrexia, so that the ordinary febrifuges could be advantageously given. In gastric fever, Trusen trusted to it solely for the removal of the disease: he found that it corrected the morbid secretions from the mucous membrane of the digestive tube. Other physicians have also derived equally favourable results from its administration in that disease.

6. In gastromalacia, it has been prescribed by Rhades, Blasius, and Winter, but as Riecke,¹ from whom this detail of the experience of the German practitioners has been chiefly taken, properly observes, farther observation is necessary before we can decide as to its efficacy in such cases.

7. In erysipelas, especially of children, it has been recommended by Kopp.

8. In inflammation of the liver, favourable results were obtained from it in the Children's Hospital of St. Petersburg; and it exhibited, in these cases, the analogy to calomel in its action, which has been pointed out by many observers.

9. In hydrophobia, it has been used both internally and externally as a preventive, especially by the Italian physicians Brera, Previtali,² Ghisaldoni, Agliati, Arrigoni, Narcisi, and Anelli, whose experience is in its favour. Wendelstädt and Rupprius have likewise published favourably regarding it. It is obvious, however, that much fallacy may arise as to the precise agency of reputed preventives. Every one, for example, who may be bitten by a mad dog is not attacked with hydrophobia; and, unless great caution be used, any article may be regarded as a preventive. This is the main reason why we have so many preventives of hydrophobia and other diseases.

10. Again:—the solution of chlorine has been advised by Rupprius and Mertzdorf in dropsy, especially such as supervenes on the acute exanthemata.

11. In the diathesis phthisica, it has been recommended by Göden, and has been affirmed to moderate the hectic in phthisis, and to make the remissions more marked. In these cases, it requires to be given in large doses, and to be exhibited for a considerable time.

¹ Op. cit. S. 34.

² Pratiche Osservazioni sull Idrofobia, &c. Milan, 1820.

12. In many cases of chronic cutaneous affections, with diminished plastic energy, it has been used with success by Kopp.

13. Lastly : in noma, or cancrum oris, and in fœtor of the mouth, it has been recommended internally as well as topically ; and, according to the experiments of Persoz, Nonat, and others, it renders eminent service in cases of poisoning by the hydrocyanic acid.

Externally, it is used either pure, diluted with water, or in combination with oil. Godier affirms that he cured strumous swellings of the glands by a cerate of chlorine. Eisenmann, Cullerier, and Blache recommend it at times pure, at others diluted, in the way of injection, in gonorrhœa and leucorrhœa. It is employed, also, in flabby, putrid, and offensive ulcers, in the carbunculus malignus, in chronic cutaneous affections, as tinea capitis, itch, (Deimann,) herpes, (Alibert,) cancrum oris, asthenic aphthæ, &c.

Lastly : ablu-tion with a solution of chlorine, or of the chlorides, has been advised as a preventive of venereal infection. In cancerous ulcers, it corrects the unpleasant odour, and excites a new action in the part ; causing the secretion of a better pus : farther than this, we cannot expect much from it. Baths of chlorine are recommended by Wagner as an excellent means for preventing the plague. Schönlein advises that, in scarlatina, the whole surface of the body should be washed with a mixture of aqua chlorini and water, which he prefers to ablu-tion with cold water.

Finally ;—the aqua chlorini is occasionally sprinkled in the sick chamber to purify the atmosphere during the prevalency of contagious or other diseases.

MODE OF ADMINISTERING.

As already remarked, whenever the aqua chlorini is prescribed, its facility of decomposition must be borne in mind. It is, for this reason, best to prescribe it with water only, or at most with the addition of simple syrup, for internal administration. For external use, water alone should be associated with it. As to the precise mode in which chlorine is affected by fatty substances, we have as yet no accurate knowledge ; it may be calculated, however, that a part undergoes decomposition. Such combinations have, notwithstanding, been found very useful.

The solution should never be prescribed in quantity larger than is necessary for twenty-four hours, as by frequently opening the vessel in which it is contained, decomposition readily ensues. The

vessel should be put into a dark place, and be surrounded by black paper.

The average dose for an adult, in the twenty-four hours, may be fixed at an ounce, although much larger doses may be given without inconvenience. It is scarcely necessary to say that the precise dose must vary with the degree of concentration.

Unguentum Oxygenatum ex tempore parandum.

Ointment of Chlorine.

℞. Aquæ chlorin. p. j.
Adipis, p. viij. M.

Used in the itch.

PHARMACOPŒIA OF AUSTRIA.

Linimentum Aquæ Chlorini.

Liniment of Chlorine.

℞. Aquæ chlorin. ℥j.
Olei olivar. ℥j. M.

Externally in obstinate itch, tinea capitis, and herpes.

DEIMANN.

℞. Ceræ albæ, ℥ij.
Leni calor. liquef. adde
Ol. amygdal. q. s.
Ut fiat linimentum cui refrig. adde
Aq. chlorin. ℥iss. M.

Used externally in cases of ulcers.

LUDWIG.

Gargarisma Aquæ Chlorini.

Gargle of Chlorine.

℞. Pulv. tragac. gr. xij.
Aquæ, ℥iv.
Aquæ chlorin.
Syrup. aa. ℥ss. M.

To be used as a gargle in ulceration and chronic inflammation of the mouth and fauces.

RATIER.¹

¹ Formulaire pratique des hôpitaux civils de Paris, 3me édition. Paris, 1827.

CINCHONINA.

SYNONYMES. Cinchonia, Cinchoninum, Cinchonin, Cinchonine.

Although Duncan, of Edinburgh, Reuss, of Moscow, and Gomez,¹ of Lisbon, had endeavoured to separate the active principle of the cinchonas, and had given the term *cinchonine* to a resinous extract obtained in their investigations; the honour of discovering both cinchonine and quinine and of applying them to practical purposes belongs to the French chemists—Pelletier and Caventou.²

Cinchonine is commonly obtained from the gray or pale varieties of cinchona; the yellow furnishing the quinine, and the red both cinchonine and quinine. It is an alkaloid strikingly analogous to the quinine in its chemical and medical relations, but is not as much used.

METHOD OF PREPARING.

Cinchonine is obtained by boiling the bark in alcohol, until it loses all its bitterness; the alcoholic solution is then evaporated to dryness in a water bath; the extract, thus obtained, is dissolved in boiling water, strongly acidulated with muriatic acid; an excess of calcined magnesia is added, which, after a few minutes' boiling, will fix all the red colouring matter, and render the liquid clear. When cold, the liquid is filtered, and the magnesian precipitate washed with cold water; it is then dried in a stove; and all the bitterness separated by repeated digestions in boiling alcohol; the alcoholic liquors are mixed, and the cinchonine crystallises as the fluid cools. The cinchonine, thus obtained, still contains a green fatty matter, which may be separated by solution in a very weak acid. If the acid be too strong, it will dissolve a part of the fatty matter, and the intended object will be thus defeated.³

Cinchonine may also be obtained by treating pulverised pale cinchona by weak sulphuric acid, precipitating the solution by means of lime in excess; collecting the precipitate on a filter, washing, and treating it, after drying, with boiling alcohol.⁴

¹ Richter's *Specielle Therapie*, B. x. S. 325. Berlin, 1828, and Magendie's *Formulaire*.

² *Annales de Chimie et de Physique*, xv. 289 and 337.

³ Magendie, *Formulaire*, &c.

⁴ *Pharmacopée Universelle*, i. 414. Paris, 1828.

Cinchonine is white, translucent, crystallising in needles; requiring, for its solution, 700 parts of cold water, according to Magendie; according to others, 2500 parts of boiling water. On account of its very sparing solubility in water it has but a slightly bitter taste. In alcohol, it is readily soluble, and the solution is extremely bitter, as well as the salts formed by its union with acids, which resemble the salts of quinine. It does not dissolve readily in fixed or volatile oils, or in ether. At a certain temperature, it volatilises; a great part, indeed, is destroyed by the operation, yet a sensible portion escapes the decomposing power of the caloric.

In medicine, pure cinchonine, as well as the sulphate and acetate, is prescribed. The sulphate is soluble in 54 parts of water, and in 6.5 parts of alcohol, (s. g. 0.815); it is not soluble in ether. It forms crystals and tastes bitter. The acetate, on the other hand, does not crystallise; and is less soluble in water than the sulphate; but an excess of acid facilitates the solution.

EFFECTS ON THE ECONOMY.

It is not necessary to say much on the application of cinchonine and its preparations to disease, as they have been almost wholly superseded by the quinine and its salts. It is a weaker article, and therefore requires to be given in larger doses; Magendie and Gittermann assert, that it has been found ineffective as a febrifuge. Bally,¹ Chomel,² Mariani,³ Wutzer,⁴ and others, however, have exhibited it successfully.⁵ Dufresne⁶ frequently prescribed it, and he assigns it this claim to preference, that it is almost tasteless, or at least that the bitter taste is but tardily developed; and that it needs not to be given in combination with acids, as the acid contained in the gastric secretions will render it soluble.⁷ He gave it in intermittents during the apyrexia in the quantity of from six to twenty grains, and he found it, moreover, of marked use in the

¹ Nouv. Biblioth. Médicale, ix. 189.

² Nouv. Journ. de Médecine, Mars, 1821.

³ Osservaz. sulla Pratica del Solfato de Cinconina, &c.

⁴ Rust und Casper's Krit. Repert. B. xxi. and Bulletin des Sciences Médic. Sept. 1827.

⁵ Art. Cinchonine, in Mérat and De Lens, Dict. de Mat. Méd.

⁶ Bibliothèque Universelle, Mai, 1831, p. 89.

⁷ See, also, Ganz, in Bulletino delle Scienze Mediche di Bologna, Agosto et Settembre, 1836, p. 121.

cases of gastralgia with formation of acid, which are so often met with in young females, and are not unfrequently associated with leucorrhœa, hypochondriasis, melancholy, &c.

MODE OF ADMINISTERING.

The following formulæ have been recommended, but, as was before remarked, they are rarely used, the preparations of quinine being now almost universally prescribed.

Syrupus Cinchoninæ.

Syrup of Cinchonine.

- ℞. Sulphat. cinchonin. gr. xlviij.
Syrup. simpl. ℥j.

Used in the same cases as the syrupus quininæ, a tablespoonful for a dose.

MAGENDIE.

Vinum Cinchoninæ.

Wine of Cinchonine.

- ℞. Sulphat. cinchonin. gr. xvij.
Vini Maderens. ℥ij.

MAGENDIE.

Tinctura Cinchoninæ.

- ℞. Sulphat. cinchoninæ, gr. ix.
Alcohol (34° or s. g. .847.) ℥j. M.

MAGENDIE.

Magendie recommends that this tincture should be used for preparing, extemporaneously, the wine of cinchonine, by adding two ounces of the tincture to a pint of Madeira wine.

*Boli Antifebriles.*¹

Febrifuge Boluses.

- ℞. Sulphat. cinchonin. gr. iij.
Micæ panis,
Mellis,
Glycyrrhiz. aa. q. s. ut fiat bolus.

Dose,—one of these to be repeated every two hours.

BRERA.

¹ Ricettario Clinico di Brera. Padov. 1825.

Mistura Cinchoninæ.

Mixture of Cinchonine.

℞ Sulphat. cinchonin. gr. vi ad xlvij.

Potassæ acetat.

Sacchar. alb. aa. ℥ss.

Solve in

Aquæ chamæm. ℥vj.

Dose—A table-spoonful every two hours, in intermittents.

SUNDELIN.

CODEINA.

SYNONYMES. Codeinum, Codeia, Codeine.

German.—Kodein.

Although opium had been repeatedly examined by the chemists, and certain of its active constituents separated from it, it was not until within the last few years, that the article, whose name is at the head of this paragraph, had been obtained from it. It was discovered by Robiquet in 1832,¹ and as it has been exhibited as a therapeutical agent, it requires notice.

METHOD OF PREPARING.

According to Winkler,² this new alkaloid may be prepared in the following manner. The morphine is first thrown down from a solution of opium made in the cold by means of ammonia; the meconic acid is precipitated by the muriate of lime; for the removal of the colouring matter, the fluid is then treated with the extract or subacetate of lead; and the extract of lead, contained in the fluid poured off from the precipitates, is afterwards decomposed by sulphuric acid; the fluid, separated from the sulphate of lead, is now treated with an excess of caustic alkali; the mixture is exposed to the air until the excess of free alkali has attracted carbonic acid from it; it is then agitated and digested with ether, and left to

¹ Journal de Pharmacie, xix. 91 and 162. Paris, 1833.² Buckner's Report, xlv. p. 459, cited in Journal de Pharmacie, xxi. 251. Paris, 1835.

evaporate spontaneously, after which a yellowish, highly transparent, but not crystalline compound remains, which forms with muriatic acid a crystalline salt, and resembles exactly the codeine of Robiquet.

Merck¹ procures the codeine in a very simple manner. He treats morphine precipitated by soda with cold alcohol; the spirituous tincture is carefully saturated with sulphuric acid; the alcohol drawn off, and the residue treated with cold water as long as it is turbid; it is then filtered, and the filtered liquid evaporated until it has the consistence of syrup: on cooling, ether is poured over it in a large flask; caustic alkali is added in excess, and the whole strongly agitated. The ethereal mixture is then so saturated that the codeine crystallises from it in a few hours. By evaporating the ether, and treating the residue with alcohol, the codeine is obtained by degrees wholly pure, and separated from an oily matter, which is a great obstacle to crystallisation.

Codeine, according to Pelletier consists of 31 parts of carbon; 40 parts of hydrogen; 5 parts of oxygen, and 2 of azote. It is an alkaloid, soluble in water, alcohol and ether; but not so in alkaline solutions. It unites readily with acids, and, with the muriatic acid especially, forms a salt, which crystallises with great facility. When the crystals of codeine are heated on a plate of platina, they burn with a flame without leaving any residue. Heated in a tube, they melt at about 150° centigrade; and, if allowed to cool immediately, they form a crystalline mass; if, however, the heat be continued, the oleaginous fluid rises along the sides of the tube, appearing to shun the heat; but it does not volatilise. When dissolved in water, codeine communicates to it decidedly alkaline properties. 1000 parts of water at 60° Fahrenheit, dissolve 12.6 parts of codeine; the same quantity at 100°, 37 parts, and at 212°, 58.8 parts. If more codeine be added to boiling water than can be taken up, the surplus melts, and forms, like the meconine, an oleaginous layer on the bottom of the vessel. This aqueous solution, by careful refrigeration, affords a translucent and uncommonly well defined *metal*. The tincture of galls forms a copious precipitate with a solution of codeine, in which respect, the latter differs essentially from morphine, as it does in many other of its properties.

¹ Journal de Pharmacie, cited in Amer. Journal of Pharmacy, new series, i. 171. Philad. 1835.

EFFECTS ON THE ECONOMY.

As morphine does not represent the whole of the activity of opium, Robiquet concluded, that other substances might concur thereto, and he conjectured that codeine might be one of those. Under this idea, Kunkel¹ instituted experiments with it on rabbits and dogs, from which he obtained the following results.

First. Codeine differs from morphine in this, that it does not, like the latter, paralyse the lower extremities. *Secondly,* Codeine appears to exert a powerfully excitant action. It occasions convulsions of the limbs, and of the muscles of the neck, and when it produces death, this seems to be owing to its action on the cerebellum and medulla oblongata; twice he noticed symptoms of backward progression under its use, and those parts after death were found turgid with blood. To judge from the condition of the heart and lungs it affects likewise the circulatory organs. It occasions inflammation of the tissues, with which it comes into immediate contact. Its action is more energetic, when introduced into the cellular membrane, than into the stomach. It seems, also, to exhibit a special action on the urinary organs, for animals to which it is given never evacuate their bladder as long as they are under its influence. *Thirdly.* The action of codeine differs from that of the watery extract of opium, in not paralysing the hinder extremities; but it approximates it in this, that it acts, as has been said, more powerfully when introduced into the cellular membrane than into the stomach, and accelerates the respiration and circulation.

Kunkel, however, remarks upon the results of his experiments, that they demand repeated trials for confirmation, as he was only able to experiment with a very small quantity of the substance. Robiquet observes that Kunkel's experiments have led to the inference, that when codeine is combined with acids, it loses much of its efficacy—the very opposite, by the way, to the inferences of Magendie.

Barbier² has taken considerable pains to fix the value of codeine as a remedial agent. He prescribed it in the dose of one or two grains in a syrup, prepared with the aqueous solution of the alkalioid, of such strength, that a table-spoonful or half an ounce contained one grain of codeine. In his opinion, it exerts a peculiar agency on the nerves of the ganglionic system, whilst it appears to

¹ Journal de Chimie Médicale, ix. 223.

² Gazette Médicale, Mars 8, 1834.

possess but little influence on the hemispheres of the brain, and to make no impression upon the spinal marrow. In the epigastric region, he remarks, the agency of codeine is powerfully manifested; and here in the centre of the ganglionic system, its effects may be investigated, and their extent and magnitude appreciated. If a spoonful, or, at an interval of from one to two hours, two spoonfuls of the syrup of codeine be administered to one affected with the symptoms to be described immediately, we shall find, that it exhibits a considerable and remarkable effect upon the economy. If the person complains of pain in the epigastric region, beneath the lower extremity of the sternum, and stretching to the sides and back; and if, with these symptoms, there is combined a feeling of heat, indescribable anxiety, marked debility, paleness, decided alteration of the features; a sense of painful traction sometimes on one side, at others in the other side of the epigastric region, with tendency to syncope, frequent sighing, despondency, and more or less sensibility to pressure in the epigastric region, &c., Barbier considers the seat of the disease to be the epigastric nervous plexus; and in such cases, he says, he has found no remedy superior to the syrup of codeine. He has observed it afford decided relief where the coats of the stomach were manifestly in a state of degeneration. A common effect of the codeine is sleep; which is never accompanied by heaviness of the head, or by determination of blood to the brain. When the persons awake from the sleep produced by codeine, the countenance is bright and lively, and there is a tendency to laughter. Barbier was led to believe, that it does not affect the nervous cords connected with the vertebral portions of the centre of the nervous system. In his observations at the hospital of Amiens, he often noticed the neuralgic affection of the abdomen above mentioned to be accompanied by pains in the head, loins, and limbs, and whilst the codeine relieved the abdominal uneasiness, it left the others untouched—a singular circumstance if true, but requiring fresh observation before we can esteem it to be established. He remarks farther, that almost all the patients that were benefited by the codeine had used laudanum unsuccessfully. Codeine, he adds, occasions no manifest change in the circulation and respiration; it does not disturb the digestive function; seems merely to diminish the feeling of hunger, and occasions no constipation. During its use, itching of the surface is frequently experienced. When applied to the skin, it induces no striking phenomena. When applied, in the dose of two grains, to a surface abraded by a blister, it excites a painful sensation of burning,

without any other change appearing to supervene; the neuralgic pains, for the removal of which it may have been thus employed, not appearing to be modified by it.

Mr. Gregory made experiments upon himself and some of his pupils with the nitrate of codeine. None of them experienced any effect from a dose of three grains and under; from four to six grains, however, occasioned striking symptoms—quickness of the pulse, sense of heat in the head and face, remarkable excitement, like that following the use of intoxicating liquors; agreeable, and apparently permanent, stimulation, accompanied by considerable itching, which began at the head and extended over the whole body. To this succeeded, in the course of a few hours, a disagreeable sense of relaxation, with nausea, and often vomiting. None of the experimenters felt the slightest inclination to sleep, until after the supervention of the feeling of relaxation.

Riecke¹ thinks, that these experiments confirm Kunkel's observations, that the codeine loses its efficacy when combined with acids.

In the year 1834, M. Martin Solon, at one of the sittings of the Académie Royale de Médecine, when the experiments of Barbier with codeine were the subject of discussion, confirmed his views regarding its soporific property. It appeared to him to allay the cough of the consumptive. He remarked, however, that he had not observed the effects on the ganglionic nervous system, which Barbier had witnessed.

Magendie² took a grain of codeine, dissolved it in a little water, and injected it into the jugular vein of a middle sized dog, which was immediately thrown into a profound sleep—readily broken, however, by any strong noise made in the vicinity of the animal; but the interruption was of brief duration,—sleep soon recurring. This condition persisted for several hours without being accompanied by any unpleasant symptoms. The effect was not the same with the muriate of codeine; a single grain of this salt introduced in the same manner into the organism suddenly induced deep sleep, but after the animal had slept five or six hours, it died. Several similar experiments afforded a like result. Magendie administered the codeine in the Hôtel-Dieu to different patients. He found that one grain, given once or twice, succeeded,

¹ Die neuern Arzneimittel, u. s. w. S. 140. Stuttgart, 1837.

² Formulaire pour la preparation et l'emploi de plusieurs nouveaux médicaments. Edit. 9me. Paris, 1836.

in many cases, in inducing a quiet and soft sleep, to which no confusion succeeded the next day, as is commonly the case with morphine. As respects intensity of action, he compares one grain of codeine to half a grain of morphine. Two grains often excited nausea, and even vomiting. Magendie found the muriate to be decidedly stronger than the pure codeine. Two grains commonly induced, besides sleep, vertigo, nausea and even vomiting; but this dose succeeded like a charm, in cases of neuralgia faciei and in sciatica, which had resisted the most valued agents.¹

Dr. Miranda, of the Havana, has published² the results of his experience with codeine in what he calls powerful nervous irritations of the mucous membrane of the stomach, and he affirms, that he cured eleven cases by the syrup of codeine alone.

He began with a dram of the syrup night and morning, and gradually increased the quantity to an ounce in the twenty-four hours. His success was so striking that he is induced to "regard the discovery of codeine as fortunate for humanity, especially for climates like that of the Havana, in which gastrites are so multiplied."

The *syrup of codeine*, *syrupus codeinæ*, is directed by M. Cap³ to be prepared in the following manner :—

℞. Codein. gr. xxiv.
 Aquæ distillat. ℥iv.
 Sacchar. purificat. ℥viiij.

Reduce the codeine to an impalpable powder in a glass or porcelain mortar. Triturate with one third of the water, allow it to settle and decant. Treat the residuum with another third of the water, and again with the remainder. Put the whole into a small matrass, covering the opening with a piece of moistened parchment perforated with a pinhole. Heat in a water bath until the codeine has entirely disappeared. Remove the matrass from the fire to add the sugar; cover the opening again; agitate, and put the vessel again in the bath, until the sugar is completely dissolved.

Each ounce of the syrup contains two grains of codeine.

The muriate has been used in this city, but it has not been found

¹ Gully's Translation of the 8th edit. of Magendie's Formulaire. Lond. 1835.

² Journal de Pharmacie, xxiv. 145. Paris, 1838.

³ Ibid. xxiii. 418. Paris, 1837.

to possess any virtues which the salts of morphine do not; whilst its price is enormous—as much, we are informed, as four dollars the dram.

COLCHICUM AUTUMNALE.

SYNONYMES.—Colchicum, Meadow Saffron.

French.—Colchique, Tue-Chien, Mort aux Chiens, Safran des Prés, Safran Bâtard, Vieillotte.

German.—Herbstzeitlose, Zeitlose, Wiesensafran, Herbstblume.

The meadow saffron is a well-known plant in the temperate parts of Europe, where it grows wild in moist meadows. It belongs to the family Colchicaceæ; and, in the Linnean system, to the class Hexandria, order Trigynia. The plant is avoided by cattle; and its active poisonous properties have been long known; fatal cases, indeed, still occur every now and then from its employment, not only in animals, but in consequence of its too free use in the treatment of gout. A case is given of a man who took, by mistake, an ounce and a half of the tincture, and died in forty-eight hours, after much suffering from vomiting, acute pain in the stomach, colic, purging, and delirium.¹ The cases of two children are also on record, who were poisoned by a handful of the seeds, and who died in the course of the day, death being preceded by violent vomiting and purging. In the bodies of these children, considerable redness of the mucous coat of the stomach and small intestines was found; in other cases, no morbid appearance has been detected.²

Colchicum is not of modern introduction. It is, indeed, the Hermodactyl of the ancients. It had, however, almost wholly fallen into neglect, when its use was revived in Great Britain, in the first quarter of the present century, as an excellent agent in rheumatic and gouty affections. That it is highly esteemed as a therapeutical agent is shown by the number of officinal works into which it has been admitted. Amongst others, it is in the pharmacopœias of Austria, the United States, Amsterdam, and Anvers, and in the Batavian, Belgic, Brunswick, Danish, Dublin, Spanish, Edinburgh,

¹ Edinb. Med. and Surg. Journal, xiv. 262.

² Christison on Poisons, 3d edit. p. 791. Edinb. 1836.

Paris, Ferrara, Geneva, Hamburg, Hannoverian, London, Lisbon, Russian, Saxon, Swedish, and Wirtemberg.

Several chemists have investigated the composition of the plant. Pelletier and Caventou believed that they had found veratrine in it; but, from the examination of Geiger and Hesse, it appears that the alkaloid, discovered by those gentlemen, was not veratrine, but a peculiar principle, *colchicine*, which is found in every part of the plant; crystallises in slender needles, is inodorous, and of a very bitter, and afterwards biting taste. Introduced into the nose, it does not occasion sneezing like veratrine. It has but a feeble alkaline reaction; but neutralises acids completely, and forms with them crystallisable salts, which have also a bitter pungent taste. It dissolves with tolerable facility in water.

For therapeutical purposes, the root or bulb, (cormus,) as well as the flowers and seeds of the colchicum have been administered. The fresh root has a somewhat disagreeable smell, and a bitterish acrid taste. When chewed for any length of time, it excites the secretion of saliva and thirst; destroys the feeling of the tongue; causes a sense of burning in the mouth and lips; constriction of the fauces, hiccup, violent pains in the abdomen, vomiting, diarrhœa, and discharge of blood upwards and downwards.

By drying, the bulbs lose somewhat of their efficacy. The seeds have of late come much into use. They are inodorous, but of a very acrid taste. Their agency is like that of the bulb, and—some think—they are more equable in their effects. To ensure this, however, they must be gathered wholly ripe, when they first become entirely black. They have been highly recommended by Dr. Williams and others.

The flowers are the mildest part of the plant. They have likewise been successfully administered by several English physicians.

EFFECTS ON THE ECONOMY IN HEALTH.

In its effects, colchicum resembles digitalis in one thing, that it renders the pulse less frequent,¹ according to Thomson and Wallis; but, in other respects, Osann and Riecke² think it agrees more with the squill. In moderate doses, the different parts of the plant that

¹ Art. Colchicum, Encyc. Wörterb. der med. Wissensch. viii. 136. Berlin, 1832.

² Op. cit. S. 142.

have been mentioned act as diaphoretics, diuretics, and cathartics. On the digestive organs, they are conceived to produce less debilitating effects than the squill.

Sir Everard Home ascribes much of the griping and nauseating effect, that sometimes follows the use of the vinous and other tinctures of colchicum, which have not been carefully filtered, to the sediment which forms in them, and which may be removed without injury to the desired effect of the medicine.¹

Several experiments were made with the colchicum on healthy individuals. In the first case, 160 drops of the vinous tincture of the seeds were taken in 24 hours by a young man, aged 18: the first dose being 50 drops, the last 60. Seven copious evacuations were produced, with loss of appetite and debility, for 24 hours. In the second case, a youth, 17 years old, took 170 drops in 9 hours, in doses of 70, 30, and 40 drops; nausea and vomiting, and six copious evacuations followed. Third case; a youth, aged 15, took 130 drops in 10 hours, and in four doses; the first of 40 drops, and the last three of 30: vomiting and only one stool were the result. Fourth case; a youth, aged 12, took 60 drops in two doses, after an interval of eight hours: nine copious watery evacuations were produced. Fifth case; a youth, aged 17, took 40 drops at bed-time, 30 drops next morning, and 30 drops seven hours after—in all, 100 drops in 19 hours: vomiting and faintness, and five copious evacuations were the result. The same boy afterwards took 70 drops at one dose, which were followed by vomiting and headach, but not by purging. Sixth case; a boy, aged 10, took 80 drops in 24½ hours, in four doses, of 20, 15, 25, and 20 drops: great sickness and vomiting, and nine evacuations resulted.

EFFECTS ON THE ECONOMY IN DISEASE.

The diseases in which colchicum is recommended, are as follows:

In gouty and rheumatic cases, it has been supposed to be almost a specific. Numerous practitioners have testified to its valuable agency in such affections; among these may be named Mr. Want, Dr. Johnson, Dr. Williams, Mr. Battley, Dr. Armstrong, Sir Everard Home, Sir C. Scudamore, Mr. Haden, Dr. Copland, Dr. Graves, Sir Henry Hallford, Dr. Wallis, Dr. Barlow,² and Mr.

¹ Brande's Dictionary of Mat. Med. p. 189. Lond. 1839.

² Art. Gout, in Cyclopædia of Practical Medicine.

Wigan,¹ in England; and Locher-Balber, Kahleis, Gumpert, Plasse, Weber, Klokow, Biermann, &c. in Germany.²

Colchicum is presumed to be the active ingredient of the celebrated gout remedy—the Eau medicinale d'Husson—which has been considered to be formed of two ounces of the colchicum root, macerated in eight ounces of Sherry wine; the dose being from twenty to eighty drops.

In acute rheumatism, as well as in various inflammatory affections, colchicum was proposed by the author's friend, Mr. Charles T. Haden,³ as an excellent sedative to reduce excited organic action, which he conceived it capable of effecting to such an extent, that blood-letting might generally be rendered unnecessary in febrile and inflammatory disorders;⁴ yet, in the very cases in which it was esteemed so appropriate by Mr. Haden and by Carminati,⁵ it is regarded unadvisable by others. Thus, Riecke,⁶ speaking of its use in acute rheumatism, says that it was at one time given in that disease under the most opposite circumstances, but that it was soon found necessary to restrict its employment within narrower limits, and to pretermmit it when any considerable febrile condition existed.

We have often exhibited the different preparations of colchicum in gout, and frequently with decided advantage; but very often it has failed altogether. In our own person, it has never appeared to prevent or to modify the paroxysm. In acute, and the same may be said of chronic rheumatism, its advantages have not been by any means clearly marked in our experience: many physicians, however, testify most strongly in its favour. Like other acronarcotics, as the *actæa racemosa*, when pushed to the extent of slightly affecting the system, as shown by nausea, with some cerebral confusion, it

¹ *Lancet*, and *Med. Gaz.* June 30, 1838. In rheumatic gout, Mr. Wigan gives it in the dose of eight grains every hour, until "active vomiting, profuse purging, or abundant perspiration takes place, or at least until the stomach can bear no more." Thus administered, he pronounces it to be "the most easily managed, the most universally applicable, the safest, and the most certain specific (?) in the whole compass of our opulent Pharmacopœia."

² Riecke, *Op. cit.* and Richter's *Specielle Therapie*, x. 180. Berlin, 1828.

³ *Practical Observations on Colchicum Autumnale in Inflammatory Diseases.* Lond. 1820.

⁴ See, also, Dr. Lewins, in *Edinb. Med. and Surg. Journal* for April, 1837, and in *Brit. and For. Medical Review*, for Oct. 1837, p. 565.

⁵ *Memor. dell' Istituto del Regno Lombardo-Venet.* 1819.

⁶ *Op. cit.* S. 143.

has at times effected a revulsion, which has broken in upon the morbid chain in cases of acute rheumatism. In chronic rheumatism it has exhibited less marked results: yet there is no agent, perhaps, which is so much employed in rheumatic cases in general.

In none of these cases, according to most observers, need any sensible evacuation be produced by it, although some, we have seen, have affirmed—and such is the result of our observation—that it is more efficient when it evinces its influence upon the skin or alimentary canal.¹

The vinous tincture of the seeds has been extolled in the tetanus of warm climates, by Dr. W. G. Smith,² of Port-au-Prince. He begins with $\mathfrak{zss}$ and increases the dose every half hour, repeating it until emesis or catharsis has been produced. The remedy is then discontinued.

In dropsy, colchicum was used of old with good results; and it has been employed in modern times. Carminati gives the details of a case of dropsy supervening on scarlatina, and Plasse, one of hydrothorax, in which it was advantageously prescribed. In such cases, it may be well to push the remedy until it affects the bowels.

In chronic bronchitis it has been given by many physicians, and especially by Drs. Armstrong³ and Hastings,⁴ with advantage. By Ritton⁵ it has been advised as an extremely efficacious remedy in leucorrhœa, in the dose of five grains of the powder three times a day; and in several spasmodic diseases it has been extolled by Raven. Mr. Tait⁶ speaks in exalted terms of it in scarlatina—the dose, to children from four to six years of age, being three or four drops of the vinum colchici every three or four hours. Mr. Fosbrooke advises it in ischuria; Elliotson saw favourable effects from it in obstinate prurigo; Bullock gave it in erysipelas; and by Chisholm and Baumbach⁷ it was exhibited successfully against tapeworm.

The colchicum is sometimes applied externally as a liniment to rheumatic joints, in the form of the tincture of the seeds or bulb.⁸

¹ See Wood and Bache's Dispensatory, Art. Colchicum; and Lewins, *Op. citat.*

² Amer. Journ. of the Med. Sciences, for Nov. 1835, p. 66.

³ Pathology of Consumptive Diseases. Lond. 1822.

⁴ Inflammation of the Mucous Membrane of the Lungs. Lond. 1821.

⁵ Lancet, August 2, 1834.

⁶ American Journal of the Medical Sciences, May, 1838, p. 205.

⁷ Rust's Magazin, B. xxi. S. 270; and Osann, in art. Colchicum, in Encyclopäd. Wörterb. der medicin. Wissenschaft. B. viii. S. 136. Berlin, 1832.

⁸ Dictionnaire de Matière Médic. par MM. Mérat & De Lens, ii. 361.

Of late, it has been recommended by Mr. Wansborough in gout;¹ two drams of the tincture of the seeds being added to ʒiv of a spirit lotion. It is affirmed, however, that the local use of morphine had the same effect,²—the part being bathed in hot water for a minute, and then lint being applied, spread with simple cerate, on which about three grains of acetate of morphine were distributed.

Still more recently, Mr. Laycock³ has advised the tincture of the root as an external application in rheumatism, alone or combined with the tinctura camphoræ. It has been used in the author's clinique at the Philadelphia Hospital, and often with advantage; but whether much or any of the benefit was produced by the colchicum, the author was unable to decide.

MODE OF ADMINISTERING.

Colchicum is not so frequently given in substance, although we often prescribe it in this form. The dose of the powdered root is from three grains to ten, given several times in the day. The officinal preparations of this country and Great Britain are;—the acetum colchici (United States and London); the oxymel colchici (Dublin); the syrupus colchici (United States and Edinburgh); the vinum colchici radiceis (United States and London); and the extractum colchici aceticum (London). These are made from the bulb.

The officinal preparations from the seeds are the tinctura seminum colchici (Dublin); and vinum colchici seminis (United States).⁴ The London Pharmacopœia has, likewise, a spiritus seminis colchici ammoniatus or tinctura colchici composita, which is much used by the English physicians; and is formed by macerating two ounces and a half of bruised colchicum seeds in a pint of aromatic spirit of ammonia. Battley recommends an Extractum colchici e succo bulborum recentior expresso, and such a preparation is in the Pharmacopœia of Austria.⁵ The dose is two grains every two hours.

Dr. A. T. Thomson recommends a saturated vinous tincture, made by macerating an ounce and a half of the dried bulb in twelve

¹ Lancet, July 29, 1837.

² Ibid. August 5, 1837.

³ Lond. Med. Gaz. March 16, 1839.

⁴ Dunglison's General Therapeutics, Philad. 1836; and Dispensatory of Messrs. Wood and Bache.

⁵ Jourdan's Pharmacopée Universelle, i. 436. Paris, 1828.

ounces of white wine. From thirty to sixty minims to be given to gouty patients when in pain.

The dose of the powdered root or seed is, as we have said, from three to ten grains; of the acetum colchici, from thirty minims to one fluid drachm; of the syrupus colchici, from one fluid dram to half a fluid ounce; of the vinum colchici radiceis, from fifteen minims to one and a half fluid dram; and of the vinum colchici seminis, from one to two fluid drams.

Dr. Copland¹ suggested the use of the fresh flowers in the form of vinegar, tincture, &c., as milder than the seeds or bulbs, and yet equally efficacious in rheumatic and other affections; but they are not employed.

Mistura Colchici.

Mixture of Colchicum.

	℞. Magnes. sulphat. ℥j ad ℥ij.
Solve in	Aquæ menth. crisp. ℥x.
Adde	Acet. colchic. ℥j ad ℥iss. Syrup. croc. ℥j. Magnes. ʒviij. M.

To be well shaken. Three table-spoonfuls to be administered, so that from four to six evacuations may be produced in twenty-four hours. Given in paroxysms of gout.

SIR C. SCUDAMORE.

Guttæ Colchici Compositæ.

Compound Drops of Colchicum.

	℞. Extract. aconit. ʒi to ʒss.
Solve in	Vin. sem. colchic. ℥ss. M.

Fifteen, twenty, thirty, or forty drops to be given three times a day.

WEBER.

℞.	Tinctur. sem. colchic.
—	guaiac. simpl. aa. ʒiij. M.

Dose—Thirty or forty drops three times a day, in chronic rheumatism.

BLASIUS.

¹ Lond. Med. Repos. 1823.

℞. Tinct. sem. colchic.
 ——— digit. aa. ʒij.
 Sp. æther. nitric. ʒj. M.

Dose—Twenty drops on sugar.

HILDENBRAND.

Pilulæ Colchici.

Pills of Colchicum.

℞. Pulv. colchic. gr. iij.
 Saponis medic. q. s. ut fiat pilula.

Dose—Three daily, increasing the quantity to five or six.

RITTON.

Linimentum Colchici et Camphoræ.

Liniment of Colchicum and Camphor.

℞. Tinctur. rad. colchic.
 Camphoræ, aa. partes æquales. M.

LAYCOCK.

CORTEX ADSTRINGENS BRASILIENSIS.

This bark was introduced into Germany, in the year 1818, by Schimmelbusch, a merchant, who carried it from Brazil, where it had long been used internally as well as externally, as an excellent astringent.¹ According to Von Martins,² it is the bark of the acacia jurema, but this is not certainly determined.³ Merrem⁴ affirms, that the genuine bark is in more or less flat pieces, at times in half, or complete rolls, from four to twelve inches long; from an inch to two inches and a half broad, and from one to four lines thick: these are more frequently straight than crooked. The bark may be separated into two parts, an outer, which is rough, and an inner rind of a smooth fibrous character: the two are but loosely connected together. The outer bark is of a grayish brown colour, traversed by longitudinal and transverse furrows, having, here and there, white and grayish white crusty growths, covered with a foliated lichen. The inner bark is of a dark red brown on its outer sur-

¹ Von Schlectendal, in Encyclop. Wörterb. der medicin. Wissenschaft. B viii. S. 538. Berlin, 1832.

² Reise, ii. 788.

³ Riecke, Die neuern Arzneimittel, S. 146.

⁴ Ueber den Cortex adstringens Brasiliensis. Köln, 1828.

face, and, after the outer bark has been separated, is somewhat smooth: on the inner side, it is of a brighter reddish brown, and, probably owing to the laceration of the woody splinters, somewhat fibrous. The younger bark is smooth in the fracture, and of a dull splendour. The older bark, which is thicker, is unequal, and may often be separated into fibrous layers, which are readily lacerable. When chewed, it has a tolerably strong astringent, somewhat bitter and disagreeable taste, but it does not excite nausea, or leave any *arrière-gout*. It has scarcely any smell. In its chemical relations, it resembles the ratanhia.¹

EFFECTS ON THE ECONOMY.

Merrem, who made numerous experiments with this bark, affirms, that whilst it possesses the properties of astringents in general, and to a high degree, it is rather sedative than exciting, agrees with the digestive organs, and aids the peristaltic action. He employed it, first, with more or less success, in hemorrhage—in epistaxis, hæmoptysis, and metrorrhagia; and Günther² found it very efficacious in profuse menstruation arising from atony of the uterus. Secondly; in mucous discharges, as leucorrhœa, blennorrhœa, &c. Thirdly; in inflammatory and exanthematous affections—as cynanche, urticaria, and in periodical erysipelas of the face. Fourthly; in nervous diseases, especially when combined with disturbance of the menstrual function, and leucorrhœa: and, fifthly; in weakness and catarrhs of the genital organs, bladder, and rectum. The Indians consider, that the bark affects especially the generative apparatus, and, from the experiments of Merrem, it would seem, that its agency is more particularly exerted in cases of leucorrhœa; and in many, after the cinchona had been administered without effect.³

MODE OF ADMINISTERING.

Merrem prescribed it in various forms. He gave the powder in doses of from ʒj to ʒss, three or four times a day, mixed with water. It appeared to him to act most beneficially in cases of mu-

¹ See the analysis by Hofrath Trommsdorff, in Brande's Archiv. B. xxxiii. S. 260; and Dierbach in Heidelberg. Annalen, B. x. H. 3. S. 357. Heidelb. 1834.

² In Harless Rhein-Westphal. Jahrbüchern, B. viii. St. 1, S. 72; and Brande's Archiv. Band xi. S. 200.

³ Osann, in Encyc. Wörterbuch der medicin. Wissensch. viii. 541.

cous discharges unaccompanied by disorder of the digestive functions; and he found that the powder was better borne by some than the decoction, which is somewhat singular, as the woody matter is more apt, in such cases, to disagree. He rarely gave it combined with aromatics, and never found the combination of use. To form the decoction, an ounce of the coarsely powdered bark was boiled with sixteen ounces of water, down to ℥vii ; and to this an ounce of syrup was added. The dose was from one to two spoonfuls every two hours. Merrem also prepared an extract, and a tincture, in the same manner as these preparations are made of the cinchona; of the former he took from one to two drams, dissolved it in six ounces of an aromatic water, and added ℥ss of syrup. Of the mixture, a spoonful was given every hour.

Externally, the decoction was injected three times a day in leucorrhœa, and in bleunorrhœa; or, in the former disease, a sponge imbued with the decoction, was introduced, and kept there for some time. It has been applied, also, as an astringent to ulcers.

Mistura Corticis Brasiliensis Adstringentis.

Mixture of the Astringent Bark of Brazil.

- ℞. Decoct. cort. adstring. Brazil. ℥vii .
Copaib. cum vitelli ovi q. s. subact.
Tinct. ferri pomati aa. ℥ij .
Syrup. balsam. ℥j . M.

Dose.—A spoonful every two hours, in obstinate gonorrhœa and leucorrhœa. MERREM.

- ℞. Cort. adstring. Brasil. ℥ss .
Coque cum aquæ fontan. q. s.
Sub fin. coction. adde
Herb. sabin. ℥ss .
Colaturæ, ℥vii . adde
Syrup. cort. aurant. ℥j .

Dose.—A spoonful every hour, in cancer of the uterus, and in the hemorrhage thence arising. MERREM.

CREOSOTON.

SYNONYMES.—Creosotum, Kreosoton, Kreosotum, Creasoton, Creosote, Creasote, Kreosote, Kreasote.

German.—Kreosot.

This substance was first discovered, a few years ago, by Reichenbach, of Blansko, and is extensively employed as a therapeutical agent. Its marked chemical properties suggested, that it might be possessed of a decided influence on the economy, and numerous experiments were immediately instituted to test the accuracy of the notion. These were of the most opposite character, and it is not surprising, as in every similar case, that there should have been great discrepancy in the results, and in the opinions deduced therefrom. There can be no doubt, however, that the creosote forms a valuable addition to the list of our remedial agents.

MODE OF PREPARING.

The process given by Koene,¹ is esteemed one of the best for preparing it on a large scale;—almost the only way in which it is formed: we consequently meet with it only in commerce;—being rarely made in the shops.

Tar, derived from pit-coal, is distilled in a retort provided with a long tube, having a large mouth. Under this is placed a receiver. The oil, which comes over first, swims on water; and it is necessary to remove, from time to time, the products of the distillation, until an oil is obtained, which sinks in water. When this is the case, the product is collected. The heavy oil, obtained during the distillation, condenses not only in the receiver, but in the tube of the retort, where it unites with the naphthaline, forming a butyraceous substance. By applying a gentle heat, the mass will drop into the receiver. The product is now allowed to remain in a cool place for some hours, after which it is pressed. The expressed naphthaline still contains oil, which is separated by heating it with its own weight of acetic acid, until it melts. After allowing it to cool, the crystallised naphtha is pressed, and the acid adhering to the creosote is saturated with subcarbonate of potassa. The

¹ *Annales de Chimie et de Physique*. Juillet, 1835. See Cormack on Creosote, p. 36. Lond. 1836; or the Amer. edit. in Dunglison's *American Medical Library*; also, *Turner's Chemistry*, 5th edit. p. 872.

creosote is now to be shaken for a quarter of an hour with phosphoric acid, the proportions being half an ounce of the acid to twenty ounces of the oil. The mixture ought then to be agitated with its bulk of water, and afterwards be distilled with a graduated heat, care being taken to separate the oil which floats on the surface. The rectified oil is now to be dissolved in its own volume of a hot solution of caustic potassa, s. g. 1.120. When it has been allowed to cool for half an hour, the supernatant oil is again removed, and the heavy oil again treated with caustic potassa, only a fourth part of the solution being, however, employed this time. On uniting the solutions of potassa, a slight excess of diluted phosphoric acid is added, and the free creosote, which floats on the surface, is separated. It is again rectified; and the first product—which is chiefly water—being rejected, the creosote comes over pure. M. Koene recommends the substance, thus prepared, to be preserved in bottles, covered with black paper.

A protracted and complex process, like the above, necessarily makes the drug expensive, especially as the quantity obtained is but small. M. Koene procured by it ten drams from thirty-two ounces of tar. M. Lémère, one of the first Parisian pharmaciens who made pure creosote, obtained from eight hundred pounds of tar about six pounds of creosote.

Reichenbach generally prepared it from the tar of the beech by six distillations; dissolving it afterwards in a solution of caustic potassa three times, setting it free successively by sulphuric acid.¹

Giordano² has recommended the following simplified mode for obtaining it. Distil wood tar from the willow, at an elevated temperature, from a tinned copper retort, until the residue has the consistence of a soft pitch. Re-distil the liquor passed over till its residue resembles the former. The liquor, neutralised by subcarbonate of potassa, or lime-water, is re-distilled till all the oil of creosote has passed over. The oil is dissolved in caustic potassa, from

¹ For an account of this and other products of the destructive distillation of vegetable matter, see Cormack, *Op. cit.* Reichenbach's observations and experiments are contained in a work entitled "Das Kreosot in chemischer, physischer und medicinischer Beziehung, von Dr. K. Reichenbach, u. s. w. Zweite mit Nachträgen und Zusätzen von Schweigger-Seidel verm. Ausgabe. Leipz. 1835;" see, also, *Annales de Chimie*, liii. 325. Paris, 1833.

² *Annali di Medicina*, Aprile, 1835, and *Br. and For. Med. Rev.* July, 1836, p. 283. For the process of Calderini, see *Edinb. Med. and Surg. Journ.* for Oct. 1834; and for that of M. Cozzi, see *Journal de Chimie Médicale*, and *American Journal of Pharmacy*, Jan. 1839, p. 339.

which, after simmering a little, in a porcelain vessel, and cooling, the eupione, which floats, is easily separated. The same operation is repeated with the eupione, to remove all the oil that is united with it. The saponaceous liquor, treated with dilute sulphuric acid, is distilled into water, from which the creosote is separated, and the water saturated with creosote is kept for external use, or re-distilled for a concentrated acetic acid of a pungent and most agreeable odour.

Creosote is a colourless, transparent fluid. Its refractive power is very great, and in angular glass vessels it is beautifully iridescent. Its odour is penetrating, and disagreeable, but not offensive: many compare it to that of castor. It adheres to every thing, and is somewhat permanent. Its taste is at first very burning and caustic to the tongue; but on admixture with the saliva, it becomes somewhat sweetish. It has an oleaginous feel, and is of about the consistence of oil of almonds. Its specific gravity, at 68° Fahr., is 1.037. It boils at 397°, and at -17° does not congeal. When placed on paper, it forms a greasy spot, which, however, disappears after a while, and can be removed by the application of a heated body, without any residue. It is a non-conductor of electricity. With water at 68°, it unites in two different proportions;—one of the combinations consisting of 1½ parts of creosote and 100 of water; the other of 10 parts of water and 100 parts of creosote. The taste of the first mixture—creosote water—is very burning at first, and afterwards sweetish, like that of pure creosote, but of course weaker. A drop of creosote in 10,000 parts of water produces a marked impression on the tongue, and has a smoky smell. Litmus and turmeric paper are not in the least changed by it; so that it has neither an acid nor an alkaline reaction. At both poles of the galvanic battery, it furnishes numerous and striking combinations. It does not possess the property of the ordinary empyreumatic oils, of becoming yellow and inspissated. It dissolves iodine, phosphorus, and sulphur. Acetic acid at 1.070, and alcohol, dissolve it in all proportions. Ether and petroleum likewise combine with it in all proportions. With potassa, it forms two or three combinations, one of which crystallises. Resins and resinous bodies either decompose creosote, or it decomposes them. With balsams, fixed and volatile oils, camphor, and the vegetable alkaloids it unites readily. It coagulates albumen, and its antiseptic property is most remarkable, whence its name, from *κρεας*, flesh, and *σωζω*, I preserve:—*σωτωρ*, “preserver.” Fresh meat, placed in creosote water for half an hour or an hour, and then taken out and

dried, may be exposed to the heat of the sun without undergoing putrefaction. Nay, when flesh has begun to be putrid, the process ceases after it has been washed with creosote water, and if suffered to remain immersed in it for an hour, it does not subsequently putrefy. There can be but little doubt, consequently, that creosote is the main antiseptic and conservative principle of the pyroligneous acid, and of tar water. From the experiments made by Reichenbach to determine the exact components of the flesh on which the creosote acts, he arrived at the following results. It unites with the albumen and red particles of the blood in the flesh, which it coagulates, without acting on the fleshy fibre, which serves merely as the frame-work for the coagulated matters; and it is well known that dried albumen does not putrefy, but becomes hard, brittle, and transparent.

EFFECTS ON THE ECONOMY IN HEALTH.

Reichenbach has properly remarked that the excessive burning pain in the tongue, which creosote causes, must have at once suggested it to be a poisonous substance. It was soon found that plants, sprinkled with creosote water, died; that fish placed in it were convulsed; and that small animals, as wasps and flies, died when touched with pure creosote. If a small quantity of it be spread upon the hand, and washed off a minute afterwards, the place is found to present a white appearance, but without pain or inflammation. In the course of a few days, the place becomes dry, and the cuticle desquamates. When creosote is applied to a part where the epidermis is deficient, or to a wound, instantaneously an extremely violent burning pain is experienced, which continues for eight or ten minutes, but if the part be carefully washed, it gradually ceases. The cause of this is conceived to be the property which creosote possesses of coagulating albumen; and, where blood is flowing, of arresting it. If the rapid disturbance, which it excites, affects important organs, death results sooner or later according to their importance in the economy; relief, however, may be afforded by those substances that dissolve coagulated albumen, as caustic alkalies, acetic acid, &c. It is probable, however, that the poisonous properties result from its acrid character.

To appreciate the physiological effects of creosote, experiments have been undertaken by many individuals. Mignet gave a young dog, for eight days, an ounce a day of distilled water containing four drops of creosote, without any effect. When, however, he

doubled the dose, nausea, languor, subsultus tendinum and tremors occurred, followed in the course of a few days, by marked emaciation. On discontinuing the creosote, the functions gradually resumed their pristine condition, and the animal recovered its flesh. To another dog, he gave at once two drams in half an ounce of water, and immediately thereafter great prostration of the muscular system ensued—vertigo, fixed eyes, stupor, dyspnœa, accumulation of mucus in the air passages, spasmodic cough, discharge of large quantities of foamy saliva, with vomiting of a milky matter, although the animal had taken nothing of the kind. After two hours of suffering, the animal died of convulsions. The body was immediately opened; all the tissues, except the liver, exhaled a strong smell of creosote; the whole of the mucous membrane of the intestinal canal was inflamed. The matters contained in the stomach coagulated when placed in contact with albumen. When heated, they yielded a thick smoke, and a marked smell of creosote. In the heart and large vessels the blood was more firmly coagulated than usual: the lungs were gorged with blood; in the brain there was no evidence either of congestion or hemorrhage.

In another dog, into whose carotid equal portions of water and creosote were injected, death resulted with similar phenomena, but more rapidly. The precise quantity of creosote used in this experiment is not stated.

Simon, in his experiments, found that when ten drops of creosote, diluted, were injected into a vein, scarcely any effect resulted.

Reiter and Müller, who likewise made experiments on animals, agree with Simon as to the result of injections of creosote into the veins; no special symptoms were induced by it, but this appeared to be owing to the blood being instantaneously coagulated by it, which not only prevented the farther progress of the creosote, but also of the blood, hence no evil consequences resulted; and it is probable, as Riecke has suggested,¹ that the weaker the solution of creosote, within certain limits, the greater may be its effect on the mass of blood.

Corneliani,² an Italian physician, has also instituted a series of experiments with creosote on lambs, rabbits, &c. All these animals bore small doses of creosote—however unwillingly it might be

¹ Die neuern Arzneimittel, u. s. w. S. 153.

² Giornale delle Scienze Medico-Chirurgiche, No. 8. Febrajo, 1835; Brit. and Foreign Med. Review, p. 265, Jan. 1836, and Journ. de Chimie Médicale, Fev. 1836.

taken—without any remarkable results, and without loss of appetite. Large doses, however, immediately occasioned general torpor, sudden inclination to pass the urine, paralysis—especially of the lower extremities—with or without convulsions, and frequently the ejection of a bloody foam. When the doses were large, and it was but little diluted, death took place in a few minutes, and on examination, the inner lining of the stomach was generally found corroded, yet not so constantly as to allow of death being ascribed to that circumstance.

It followed, farther, from his experiments, that pure creosote applied to a denuded nerve, or injected only in small quantities into a vein, may occasion death suddenly, and that the application of the creosote to extensive wounded surfaces in the same animals may be ultimately followed by fatal consequences.

Where a very large dose of creosote was administered, immediate death was produced without organic lesion.

In the trials made with it by Dr. Elliotson,¹ he found no action produced upon the bowels; but it sometimes augmented the quantity of urine. He once saw it, in doses of a minim three times a day, cause micturition nine times in an hour. In another case, in doses of three minims, it produced severe strangury.

According to Simon, when applied to the muscles, it destroys the surface like a caustic. Müller and Reiter, in their experiments, found that it speedily rendered the muscular fibres of a dirty whitish appearance, and readily lacerable. When applied to the fresh blood of the hog, it converted the colour in an instant to an ashy gray; after which it became black and quickly coagulated. Mixed, either pure or diluted, with blood, it thickens it, the mixture assumes a brown red colour, and it is found studded with small white points, which are nothing more than coagulated albumen. On exposing the coagulum to the air, it assumes a yellowish red colour. Reich, on the other hand, who appears to have made many experiments with creosote, both in internal and external diseases, affirms, that he has never observed any caustic effect from it; from which assertion, as Riecke has remarked,² the only inference to be deduced is, that he must always have applied it largely diluted. Frémanger likewise asserts, that when pure creosote is applied to the epidermis, it does not destroy it; but merely occasions more or less redness of the skin. When applied to a suppu-

¹ *Medico-Chirurg. Transact.* vol. xix. Lond. 1835.

² *Op. cit.* S. 154.

rating surface, it caused, instantaneously, the formation of a white pellicle, owing to its coagulating the albumen contained in the secretion from the wound. Adventitious tissues, with which it is brought in contact, are destroyed by it. When placed between the lips of a wound it prevents healing by the first intention, by coagulating the albumen, and, consequently, it may be employed in all cases where it is desirable to prevent the growing together of parts. Frémanger is, indeed, disposed to refer all its efficacy to the action, which it exerts on albumen.

Its long continued use often occasions an inflammatory condition which, as Dr. J. L. Da Luz¹ observes, has nothing in common with the disease, for the cure of which it may have been prescribed. In a case of *porrigo favosa* treated by it recently by the author, febrile irritation supervened, and the head was covered by an artificial eruption, which induced, however, a new action in the intermediate system of the scalp, and after its subsidence, the *porrigo* was cured.

Dr. Cormack, of Edinburgh, has likewise instituted various experiments on the lower animals to test the physiological effects of creosote.² In three experiments, about twenty-five drops of pure creosote were injected into the venous system of dogs. All the animals died. In every case of poisoning by it, which he has observed, Dr. Cormack found the following to be the symptoms:—Its first deleterious action was a powerful one of sedation on the heart; the vital energies of that organ seeming to be instantaneously paralysed. In some instances, hurried and sonorous respiration went on for more than a minute after the heart had ceased to beat. In general, one or two convulsions, resembling the tetanic, preceded death; and, almost invariably before expiring, the animal uttered one or more shrill cries. In every instance, the atony of the heart immediately after death was very striking.

From other experiments it appears, that when creosote is injected into the arteries the deleterious effects are of a much milder character, and if the dose is not large, the animal may experience but little inconvenience; a circumstance, which proves the importance of a thorough admixture with the blood before the poisonous article reaches the heart; such admixture not taking place, to the necessary extent, when the poison is injected into the veins, but being

¹ *Jornal da Sociedade das Sciencias Medicas de Lisboa*, tom. v. Lisboa, 1837; reviewed in *Zeitschrift für die gesammte Medicin*. Oct. 1838, S. 224.

² *Op. cit.* p. 66.

readily effected when injected into the arteries, and consequently distributed through the capillary or intermediate system.

When taken for any length of time, the urine acquires a blackish hue, and in some cases it can be recognised in the urine.¹

EFFECTS ON THE ECONOMY IN DISEASE.

Creosote has been administered in various diseases, and the following may be esteemed a summary of the therapeutical experiments made with it.

1. *Hemorrhage.* The discovery of creosote happened at a time, when the Aqua binelli enjoyed more confidence as a styptic than it does now; and the fancied probability, that the nostrum was indebted to the creosote for its properties, gave rise to many experiments with the latter in cases of hemorrhage. One of the first, who instituted experiments with it on rabbits, was G. Simon. Not being able to obtain any striking results from the aqua binelli, he tried the creosote, pure, as well as in the form of creosote water, and of an emulsion prepared with gum arabic; and from the results of these he was led to affirm, that although creosote occasioned the coagulation of the albumen of the blood, it acted no better as a styptic than cold water. With the aqua binelli he was not able to coagulate albumen. The rapid separation of the albumen in the form of a reddish gray coagulum under the influence of the creosote, he found to be of no advantage, as the mass remained soft and pulpy; and the wound in the vessel could not close, but was immediately opened by the stream of blood. Neither did he esteem it adapted for arresting trifling hemorrhages; for, when very much diluted, it is still too exciting to the injured parts, and markedly delays their union. This, indeed, might, he thinks, be expected from the fact, that pure creosote, when placed on the skin for ten or twenty minutes, induces superficial inflammation.

The experiments of other physicians have been decidedly more favourable. Müller and Reiter,² for example, in theirs, found that creosote was far more efficacious than the aqua binelli, for, when the latter was prescribed, it was always necessary to have recourse to other agents, before the hemorrhage was arrested. In their experiments on dogs, they found the hemorrhage from a divided

¹ Dr. Macleod, in Medical Gazette, xvi. 599, and xvii. 653.

² Schmidt's Jahrbuch, cited in Encyclographie des Sciences Médicales, Mars, 1837.

crural vein quickly cease, when a compress of cotton, wetted with creosote, was placed on the vessel, with a moderate degree of pressure. Three days afterwards, the crural artery was exposed on the same dog, and divided; but it was afterwards necessary to tie it, as the creosote, in consequence of the excessive hemorrhage, could not be brought into immediate contact with the vessel, but merely acted on the superficial layer of blood, and therefore did not arrest the hemorrhage.

The crural artery of a young and tolerably strong dog was cut a short distance above its division, compression being at the same time exerted upon the trunk. The artery did not bleed. Nine minutes afterwards, a compress of cotton soaked in creosote was applied immediately to the divided extremity of the artery, with some degree of pressure. When the compress was removed, the bleeding was entirely arrested, and the wounded surface was dry, and had an ashy gray hue. In an old dog, hemorrhage from a divided crural artery was arrested by the same means, but not so speedily. When the artery was examined, it was found to be wholly closed, having a navel-like depression at the extremity, which disappeared when the vessel was pressed upon, and ultimately became conical. Within the vessel was a conical coagulum, which could be readily detached; and for the space of a line, the artery appeared inflamed through its coats.

In arteries that had been divided for a longer time, the union was likewise complete; but there was this difference, that the inflammation at the end of the vessel had disappeared, and a pointed fibrous caruncle was observed in the vessel, which was doubtless the fibrinous portion of the previous coagulum.

From their experiments, Müller and Reiter were led to confirm the hæmostatic properties of creosote, both when the hemorrhage occurs from veins and from arteries. The arteries divided were of considerable size, larger than the radial artery of an adult male. They consider pressure indispensable to occasion the creosote to act immediately on the artery; and the arrest of the hemorrhage, they ascribe,—not alone to the coagulation of the blood, but to the contraction of the arteries. In parenchymatous hemorrhage, the aqua creosoti was generally sufficient; as well as in tolerably extensive wounds of the surface.

Höring, also, obtained satisfactory results from his experiments on animals. He exposed, on an old cat, the crural artery and vein of the right side; made a small incision into the latter, and pressed upon it to stop the copious flow which ensued: he then applied

over the wound, for two minutes, a small compress of lint, wetted with a solution of creosote—two drops to one hundred of water—and the bleeding ceased. The artery was now opened, and a similar compress placed upon it with the same result. Two days afterwards, a second experiment was made of the same kind, except that, owing to the struggles of the animal, a larger opening was made into the crural artery. In this case, it was necessary to apply the compress for four minutes before the hemorrhage ceased. In another cat, a large transverse incision was made on the inner surface of the right thigh, above the middle, by which muscles, arteries, veins, and nerves were divided. Two large compresses of lint, wetted with a solution of creosote, were then pressed on the parts for five minutes, and the bleeding entirely ceased. The like result was obtained in the case of an old horse, whose jugular vein was opened. But the creosote solution did not succeed in wholly arresting the hemorrhage in the same horse, when an opening was made into the crural vein and artery.

To these experiments on animals may be added some that were instituted on the human subject, and which testify, more or less, to the efficacy of creosote as a hæmostatic. Hahn applied it in some insignificant cases, but saw no better effect from it than from cold water. Most found it speedily arrest slight hemorrhages from small vessels. Höring applied it successfully in a case of epistaxis, which had obstinately resisted other agents,—two plugs of lint, dipped in a solution of creosote being inserted in the nostrils, after which the hemorrhage soon ceased. Fichtdauer employed it with equally advantageous results in violent bleeding from leech bites, after several hæmostatics had been used in vain; and Heyfelder extols it for arresting hemorrhage from large wounded surfaces.

Berthelot differs with Frémanger and Simon, who affirm that union by the first intention is prevented by it. The results of his observation were entirely opposite. Miguet applied it successfully as a hæmostatic in fresh wounds on man and animals. Both pure creosote and a solution of it were, however, unsuccessfully used by Bardili in hemorrhage from the *arteria tibialis postica*, which he ascribed to the blood having lost its albumen, owing to the excessive discharge. Reich and Hauff found injections with creosote water very useful in hæmorrhagia uteri. Schneider had a case of hemorrhage that had continued for seven hours in a man eighty years old, and which proceeded from the gums of the upper jaw; the blood oozing as from the pores of a sponge. He directed the man to take as much aqua creosoti into his mouth as he was able;

and after three repetitions the hemorrhage ceased, and did not recur.

Köhler¹ endeavoured to test the hæmostatic operation upon himself. He made an incision in his forearm an inch long, and three or four lines deep, to which he applied creosote water. A lancinating pain was felt in the wound, but no other sensible effect. A drop of pure creosote was now let fall between the lips of the wound: this was followed by a sensation of burning and drawing; for a moment, coagulated flakes of a whitish gray colour covered the wound, and there was a temporary cessation to the flow: it soon, however, recurred. After a time the hemorrhage ceased; but not sooner—Köhler thinks—than if cold water had been applied. The feeling of burning and drawing continued, however, for some time; the edges of the wound were somewhat swollen, and œdematous, and, in about four hours, were covered with a yellowish brown lymph; but there seemed to be no delay in the cicatrization.

J. L. da Luz² found it an excellent styptic in capillary hemorrhage; but in hemorrhage from great vessels it does not prevent a recurrence of the bleeding.

In hæmoptysis, too, the internal use of creosote has been found beneficial. Santini³ prescribed it in a desperate case with complete success, and with Schmalz it was equally effective; on the other hand, it was of little avail in Guitti's hands.

2. *Burns*.—Most used creosote with decided relief in burns of the second and third degree, applied by means of rags wetted with creosote water. Berthelot also cured two cases quickly with it; the slightly burnt places becoming desiccated; the more severe healing by the formation of a crust. Guitti applied both creosote water and creosote ointment with advantage in burns which had proceeded to profuse suppuration; hence, it has been advised,—

3. *In profuse suppuration*, on the authority of Levrat and Berthelot, but according to J. L. da Luz,⁴ it has no marked influence on the secretion of pus, and is therefore useless in suppurating abscesses. In otorrhœa it has been especially beneficial.

4. *Lesions of the integuments*.—According to Reichenbach, creosote is of essential service in the intertrigo of children, as well as in the excoriation induced by lying. In the latter case, Guitti

¹ Neue wissenschaftlich. Annalen, u. s. w. B. i. H. 3. S. 285. Berlin, 1835.

² Op. cit.

³ Gazzetta Therapeutica di Verona, Mars, 1834; and Amer. Journal of the Med. Sciences, Feb. 1836, p. 502.

⁴ Op. cit.

used it with success. Hahn also frequently employed it. In cases where ulceration had not taken place, he washed the parts several times a day with creosote water, and was of opinion that he had prevented, in some cases, the occurrence of ulceration. Where ulceration had already taken place, he covered the parts with linen rags folded two or three times, which he soaked in creosote water, and fixed them on by means of adhesive straps. The superficial ulcers soon healed; and the deeper were transformed into hollow surfaces, secreting a homogeneous serous fluid, but no pus.

Höring employed creosote water with advantage in sore nipples; and in sprains and contusions, the creosote ointment has been recommended by Dr. Fife.¹

5. *In chilblains*, whether ulcerated or not, Hahn² used creosote washes successfully;—the affection yielding in a few days: and Dr. Herndon³ regards the creosote ointment as the best remedy in that affection with which he is acquainted.

6. *Ulcers*.—Fissures of the skin and superficial ulcers, according to Hahn, were changed, under the application of the creosote water, into a blackish brown scab, which adhered for a long time, and when it fell off, left the parts healed; or by occasioning too much shrinking of the parts, gave rise to fresh inflammation and suppuration. Deeper ulcers were affected in the same manner as those caused by long lying.

The efficacy of this agent in atonic and varicose ulcers, especially of the leg, has been attested by Levrat, Berthelot, Rossi, Hechenberger, and others; but Guitti, Heyfelder, and Schmalz were less satisfied with it. Very recently, a case of indolent ulcer, between the knee and ankle, accompanied with a good deal of inflammation, was cured, by Dr. Crary, in five weeks, by the application of a solution of creosote (ten drops to the ounce of water), with methodical compression to the limb, by means of a bandage.⁴ Meister found the application of creosote water, in cases of carious, scrofulous, syphilitic, fistulous, and sanious ulcers, to be strikingly, and almost uniformly useful. Heyfelder, likewise, found it extraordinarily useful in scrofulous ulcers, and Dr. Cormack⁵ states, that he had recently an opportunity of seeing a case of this kind treated by Dr. Shortt, in the Royal Infirmary of Edinburgh,

¹ Lond. Med. Gazette, April 7, 1838, p. 66.

² Gazette Médicale de Paris, Dec. 1834.

³ American Med. Intelligencer, for March 15, 1838, p. 425.

⁴ Boston Medical and Surgical Journal, July 3, 1839, p. 332.

⁵ Op. cit. p. 106.

where an extensive scrofulous ulcer of the hip, after resisting a variety of treatment, at last yielded to creosote, and was ultimately completely cicatrised. On the other hand, Otto tried both the pure creosote and the watery solution in ulcers of various kinds, especially the scrofulous; the ulcers very generally put on, in the course of twenty-four hours, a cleaner appearance; still they did not cicatrise, on which account Otto prefers, in old ulcerations at least, the use of a solution of chloride of lime; for notwithstanding creosote diminished and improved the character of the suppuration from scrofulous ulcers, and rendered them cleaner, it did not ameliorate the general condition; after the diminution of the suppuration, local pains, loss of sleep, and slight febrile movements generally supervening. On these accounts, Otto does not think creosote applicable to scrofulous ulcers in general.

In scrofulous caries, many observers depose to the good effects of creosote. Among these may be mentioned Hahn, Coster, Ritgen, Frémanger, and Hauff. In fistulous ulcers—also of syphilitic origin—several physicians have employed it beneficially.

Dr. Fife,¹ of Newcastle-upon-Tyne, found it useful not merely in obstinate but in malignant ulcers. In no case of ulceration, he affirms, in which he tried it, did it disappoint his expectations. In a sloughing carbuncle, the alcoholic solution, (thirty drops to the ounce,) mixed with carrot poultices, was applied with advantage by Dr. Herndon,² of Culpeper C. H., Virginia.

In scurvy and in scorbutic ulcers, M. Coen³ found its use followed by excellent results, and he refers to cases in which it has been administered internally with very great advantage.

J. L. da Luz⁴ considers it an excellent cleansing remedy in atonic ulcers, but its prolonged use, he thinks, retards cicatrisation. In hospital gangrene, he esteems it the best antiseptic, and the most powerful means for checking its terrific progress.

In gangrenous or sloughing ulcers, Hahn used it. Several times a day he penciled the slough with pure creosote, and, in the intervals, fomented it with creosote water. According to Reichenbach, two offensive affections of the labia pudendi—the consequences of infiltration of blood—were cured by it; and Reich and Sir Francis

¹ London Medical Gazette, April 7, 1838, p. 65.

² Amer. Med. Intelligencer, March 15, 1838, p. 425.

³ Giornale per servire &c. di Venezia, 1836.

⁴ Jornal da Sociedade das Sciencias Medicas de Lisboa, T. v. Lisboa, 1837; noticed in Zeitschrift für die gesammte Medicin. Oct. 1838, S. 224.

Smith¹ treated with success cases of *cancrum oris*, and the former, one of scorbutic ulceration of the gums.

In herpetic ulcers, Höring and Berthelot observed favourable effects from the creosote water; and it has been found especially useful in carcinomatous and syphilitic ulcers, in which it has been often employed.

In cancer of the uterus, Wolff injected creosote water, in two cases, into the vagina. In one, the pain was so great, that, on the ninth day, after six pints of creosote water had been used, it was obliged to be discontinued. In the other case, the treatment was continued twenty-six days, and sixteen pints were used: in it, also, the pain was sensibly aggravated. The secretion was not improved in either case; nor was metrorrhagia prevented by it; for one of the patients died immediately after an attack of this kind: the other lingered a long time.

Heyfelder found injections of creosote water, in conjunction with the *extractum calendulæ*, of no use in cancer uteri. On the other hand, in a case of superficial ulceration of the *os uteri* with copious discharge of a puriform mucus, which had been treated unsuccessfully by other agents, for several months, Hahn found an injection of creosote water effectual in fourteen days. Téalier² has likewise given a case of superficial ulcerations around the *os uteri*, to which nitrate of silver had been applied at least twenty times without inducing a cure. By touching the ulcers with lint fixed upon the end of a probe, and dipped in a mixture of one part of creosote and three parts of water, excessive pain was induced, but this gradually passed away, and in six days the signs of ulceration had disappeared. It is more than doubtful, however, whether either of the two last cases was carcinomatous.

In a case of cancer of the breast, a solution of creosote was applied by the same gentleman. This excited, instantaneously, violent pain, but after a time the pain ceased, and relief was obtained.

Rossi saw a cancerous ulcer of the face healed by creosote ointment, but it soon broke out again. The same gentleman cured a fungous tumor on the alveolar margin of the right *os maxillare*—which had occasioned the loss of all the teeth of that side except one, and which even the actual cautery had not prevented from

¹ Dublin Journal of Med. Science, for May, 1837.

² *Revue Médicale*, Février, 1834. For similar cases, see Dr. Friese, in *Berlin. medicin. Zeitung*, Nro. 13, 1837.

returning—by a collutory of six drops of creosote in six ounces of water.

Heyfelder saw creosote used without effect in a case of cancer of the skin, and Cormack¹ in a case of lupus of the nose. On the other hand, Guitti cured an ulcer, in appearance cancerous, by the application of pure creosote, for which, at a later period, the solution was substituted, and Marchal has published a case of cancer of the lip in which he believes he accomplished a cure by means of creosote.²

Garbiglietti cured a fungous ulcer with caries of the fibula by creosote, but it is questionable whether the ulcer was carcinomatous; and Meisinger saw a cancer of the face improved by the use of creosote ointment.

It has been before remarked, that Meisinger used creosote with advantage in syphilitic ulcers. Hahn also applied creosote water in primary syphilitic sores; the small, superficial ulcers healed soon, the larger and deeper remained stationary. In a phagedenic ulcerated bubo, the spreading was arrested, but this was all. According to Heyfelder, creosote—probably the pure—excited, in a case of primary syphilitic ulcer, in a plethoric individual, violent inflammation, and so much sensibility, that it was obliged to be discontinued. Berthelot cured a chancre, which had resisted caustics and other cicatrising agencies, in a few days, by creosote water. Rehfeld, also, treated secondary syphilitic ulcers successfully with it, giving, however, at the same time, the corrosive sublimate, inwardly. Chronic venereal ulcers have in some cases yielded to it, after they had resisted every other kind of treatment.³ Dr. Bürkner, of Breslau,⁴ reports a case, which, after having proved rebellious to every kind of general and local management that could be devised, at length yielded to the application of pure creosote, by means of a camel's hair brush. The character of the secreted pus immediately improved; the wound began to heal by granulations from the base, and, at the end of four weeks, Dr. Bürkner found his patient quite well. In condylomata it has been equally successful. By the application of creosote water, Hahn found them contract and disappear; but the more obstinate required to be penciled with pure creosote.

¹ Op. cit. p. 115.

² Gazette Médicale de Paris, Fév. 1835.

³ Cormack, Op. citat. p. 107. See, also, Künchel, in Bulletin Génér. de Thérapeutique, p. 313. Paris, 1833.

⁴ Casper's Wochenschrift, Sepr. 9, 1837, S. 583.

Heyfelder, Reich,¹ Fricke, and Coen,² also found the creosote efficacious in these cases. The last gentleman but one had the most frequent opportunities for observation : by him the creosote, in a dilute state, was applied to the top of the condyloma by means of a pencil. In cases of small condylomata, touching them once or twice was sufficient for their removal ; of larger, it had to be more frequently repeated. In some obstinate cases, it required two or three weeks before the condylomata disappeared ; but when once they fell off, they did not return.

7. *Gonorrhœa and Fluor albus*.—Most extols creosote water as a remedy in gleet. He applies it either in the way of injection or by small tents wetted with it and introduced into the urethra. In fluor albus, he strongly recommends both the internal and external use of it. Reich injected creosote water in a case of gonorrhœa, and in one of malignant fluor albus ; yet its agency in these cases was doubtful as copaiba was given at the same time. Hahn³ also used injections of creosote water in the second stage of gonorrhœa, and in gleet ; but he did not think that the discharge ceased sooner under its agency than under the ordinary means ; whilst in some cases, the inflammation was even augmented. In two cases of benign fluor albus, after many other remedies had been employed in vain, Schmalz saw good effects from the use of a solution of creosote ; but in a third case it afforded no relief. Dr. Elliotson⁴ gave it internally to a female labouring under gonorrhœa, at first, in the dose of two minims to an ounce of water, and afterwards in the dose of four, six, and even eight minims, but no good resulted from its use.

We have administered it not unfrequently in leucorrhœa and other mucous discharges, and when persevered in, it has at times appeared to be of decided service.⁵

Recently Dr. Robert Dick,⁶ of Glasgow, has called the attention of the profession to its use in the chronic stage of gonorrhœa, and in gleet. He thinks its beneficial effects are more obvious than those of copaiba. He administered it in doses of two drops with loaf sugar beaten in a syrup with water.

8. *Chronic cutaneous affections*.—Reich treated a case of crusta

¹ Hufeland's Journal, Jan. 1834, and Revue Médicale, Mai, 1834.

² Giornale per servire a progressi della patologia, &c. di Venezia, An. 1836.

³ Gazette Médicale de Paris, Dec. 1834.

⁴ Lancet, for Dec. 1835, p. 435.

⁵ See, also, Coen, in Giornale per servire, &c. di Venezia, 1836.

⁶ Edinb. Med. and Surg. Journ. Apl. 1838, p. 602.

lactea externally by creosote, and internally by calomel and the black sulphuret of mercury. The result was favourable. In the itch, it was recommended by its discoverer. Wolff, too, saw three cases of not very recent itch, cured in eight days by lotions of creosote water. Reich and Coen¹ likewise extol the water and the ointment in inveterate itch. J. L. Da Luz² also considers it as valuable as sulphur, but Otto did not find the water particularly efficacious. He gives strong testimony, however, in its favour, in herpetic eruptions; in a very short time, it induced evident improvement, and often removed the affection in from eight to fourteen days. When the cases were more chronic, a longer time was of course required for the cure. He never administered it, however, without attaining his object. His rule was, to bathe the affected parts twice a day with creosote water, and in particular cases he directed, in addition, general baths of warm water. The eruption generally disappeared very rapidly under this management, but it speedily recurred unless general bathing was used at the same time. It again yielded, however, very readily to creosote water. Grandjean, Reich, and Koehler, also employed the water successfully in herpes; and Guitti found both the water and the ointment most serviceable in herpetic affections when combined with appropriate internal treatment. Heyfelder recommends that alterative drinks, as the decoctum sarsaparillæ, should be combined with them. Even in herpes exedens, the external application of creosote was found effectual by Ritgen, Grandjean, and Rossi. Wolff³ cured a case of ancient impetigo in about eight weeks, by a solution of creosote (3ss to 3v of distilled water.) At first, the application caused so much heat and inflammation, that in eight days it was obliged to be discontinued, and afterwards it was alternated with fomentations of warm water from day to day until the cure was completed. Dr. Herndon of Culpeper C. H., Va., derived much benefit from the ointment in psoriasis.

In a case of acne rosacea of seven years' standing, accompanied with headach, nervousness, thirst in the morning and acid eructations, for which the patient was put under treatment for a month without success, Dr. Elliotson⁴ determined on trying creosote.

¹ Op. cit.

² Jornal da Sociedade das Sciencas Medicas de Lisboa, tom. v. Lisboa, 1837, noticed in Zeitschrift für die gesammte Medicin. Oct. 1838. S. 224.

³ Medicin. Zeitung, u. s. w. No. 30. 1834.

⁴ Lancet, July 4, 1834, p. 459.

The advantage was soon manifest, as in three days the eruption was evidently diminished. At first, she took two minims three times a day; this was gradually augmented to twenty minims; the farther increase of the dose being prevented by the supervention of giddiness and tremors. At the end of seven months, she was discharged; the eruption being scarcely perceptible, and the dyspeptic symptoms entirely removed. In a chronic pustular disease, not curable by antiphlogistics, the same gentleman observed better effects than from any previous remedy.¹ Dr. Copland, it is affirmed, found a saturated solution in water answer well as a lotion in *porrigo favosa*.² We have often used in *porrigo*, both creosote water and creosote ointment (see the formulæ at the end of the article); they have always appeared to us sufficiently strong, and when the quantity of creosote was increased, so much inflammatory irritation was induced that they had to be discontinued for a time.

9. In a case of *chronic inflammation of the free edge of the eyelids*, with several ulcerated spots, a cure was effected by Coster, by the use, twice a day, of a dilute solution of creosote, (gtt. xij ad aquæ destillat. ʒij) applied by means of a camel's hair pencil. The cure was effected in ten days. In different kinds of *ophthalmia*, M. Sanson used the creosote, but never observed the disease to be modified by the treatment.³

10. In a case of *prolapsus vaginæ*, Schlesier tried the external use of a solution of creosote. After astringent injections, and the application of the decoctum ratanhiaë by means of a sponge, had been used in vain, he injected diluted creosote for seven weeks, omitting it only at the time of menstruation. It excited a burning sensation of a few minutes' duration. At the expiration of the time mentioned, the prolapsus had strikingly diminished, and the great sensibility of the prolapsed parts had disappeared. Owing, however, to the supervention of irritation in the urinary bladder, it had to be discontinued when there was every prospect of ultimate success.

11. Dr. Buttmann,⁴ of Vietz, circle of Landsberg, has given the case of an old lady, upwards of seventy years of age, who had laboured

¹ Medico-Chirurg. Transact. xix. 237. Lond. 1835.

² Gully's Edition of Magendie's Formulary, p. 204. Lond. 1835. See, also, Sir F. Smith, in Dublin Med. Journ. for May, 1837, and J. L. Da Luz, Op. cit.

³ Compt rendu des Séances de la Société de Médecine, Séance du 7 Mars, 1834.

⁴ Beiträgen zum Sanitäts-Berichte des Frankfurter Regierungs-Bezirks: and Medicinische Zeitung, Dec. 7, 1836, S. 252.

for several years under *œdema* of both legs to such an extent as to interfere materially with progression. She experienced lancinating pains in both feet, and irregular paroxysms of fever. Many external and internal remedies had been used in vain, when Dr. Buttmann, by way of experiment, applied cataplasms of creosote, soon after which the swelling, very much to his astonishment, gradually disappeared, and with it the febrile attacks.

12. In *toothach* from carious teeth, creosote has often been used, being applied to the hollow of the tooth by means of a pencil, or of cotton imbued with it. The testimony in its favour has been very great,—Coster, Reich, Hahn, Kneisel, Heyfelder, Fichtbauer, Hauff, Otto, Guitti, Köhler, Meisinger,¹ and numerous others. Some have advised a collutory of creosote, but this is more disagreeable, whilst it is less efficacious than creosote applied immediately to the carious tooth. It excites instantaneously acute pain and a considerable secretion of saliva. The pain is often relieved by it, but it generally recurs; and perhaps the advantage derived from this agent is not greater than from the stronger essential oils. As a palliative it is very useful. In rheumatic toothach, the insertion of a little cotton, imbued with creosote, in the ear of the same side, has been found serviceable.²

13. In *deafness*, apparently owing to a deficient secretion from the meibomian follicles, advantage has been found from the use of the creosote, after the ear had been syringed. Perhaps as good a form as any is that recommended by Mr. Curtis,³ which consists of one dram of creosote to four drams of lard. A little of this oil is inserted into the meatus night and morning, with a camel's hair pencil. He considers the preparation contra-indicated in cases of otorrhœa, where there is any pain or inflammation.

So far we have spoken mainly of the external use of creosote. Reference has been made to its internal administration in cases of hæmoptysis and fluor albus only. In the following diseases, it has been chiefly given internally:—

14. *Phthisis*.—Reichenbach excited considerable expectations from the use of creosote in phthisis,—pulmonary, laryngeal, and bronchial; and as in so intractable a disease every suggestion is

¹ Medicin. Jahrbüch. des k. k. österreich. Staates, B. xv. S. 553. Wien, 1834.

² Riecke, Op. cit. S. 167.

³ London Lancet, vol. i. p. 328, 1838-9; and Mr. Wright, *ibid.* p. 580.

immediately and eagerly embraced, numerous trials were instituted with it, the results of which were by no means accordant. Reich¹ affirmed, that he gave it both in laryngeal and tubercular phthisis with distinguished success. In a case in which the disease appeared to be considerably advanced, the offensive expectoration was changed into one of a tasteless, mucous character, although the fever and the night sweats experienced no modification. Subsequently, hæmoptysis supervened, with violent fever; on which account the dose of creosote was diminished. Under the use of the remedy the condition of the patient appeared to improve,—except the cough, which was not mitigated; an anodyne was consequently substituted for the creosote; under which, his patient—a female—improved so much, that Reich was led to believe she might be saved, although the cough still remained severe and frequent. In another case, the creosote allayed the hectic fever, and transformed the purulent expectoration into one of a mucous character: yet, although the general condition of the patient seemed to be improved, the cough and uneasiness of the chest continued almost unchanged. Grandjean also had a case of phthisis in the third stage, the expectoration of which was soon diminished; the pain in the side removed; the appetite, sleep, and strength restored, under the administration of creosote; but the result of the case is not known. Levrat asserts, that he found creosote highly useful in chronic bronchitis, and in some kinds of phthisis. Hechenberger saw good effects from the inhalation of creosote in the form of vapour in a case of ulcerated lungs; five, ten, or fifteen drops of creosote, according to the degree of tolerance of the lungs, being dropped into hot water in an appropriate vessel, and the vapour received through the tube of an inverted funnel. Hechenberger was of opinion, that this mode of exhibiting creosote prevented the disagreeable effects apt to be induced by its internal use; and farther experiments have confirmed his view. In the chronic mucous affections of the lungs of old people it appears to have been especially useful. On the other hand, Elliotson² derived no favourable results from his trials with creosote in phthisis; even inhalation of the vapour was generally unattended with any advantage; yet, he is of opinion that it may be useful where there are only one or two ulcers in the lungs, and there is no tendency to their farther production, as well as where there is much secretion from the bronchial mucous mem-

¹ Hufeland's Journal, Jan. 1834; and *Revue Médicale*, Mai, 1834.

² *Medico-Chirurg. Transact.* xix. 221; Lond. 1835.

brane. Either no advantage, or an injurious influence was derived from its use in phthisis, by Rehfeld, Haupt, Treumann, Günther, Schmalz, Meisinger, Otto, Köhler,¹ and others.

The published experiments by Wolff, in the Charité at Berlin, cannot be esteemed more favourable. It was tried in eleven cases of phthisis tuberculosa, of which one was in the first, eight were in the second, and two in the third stage. In two cases, there was scarcely any advantage after the remedy had been given for fourteen days. In one case, it had to be discontinued on the eleventh day, owing to the supervention of obstinate vomiting. The case ultimately terminated unfavourably. In six cases, the symptoms appeared to be aggravated, and the patients died soon afterwards. In two cases, in which the disease was in its second stage, death supervened unexpectedly early, on the fourth and seventh day of the treatment,—in one case by suffocation; in the other, by sudden hydrothorax. The pulse, according to Wolff, was generally increased under its use; the hectic augmented; the urinary secretion diminished; the expectoration neither changed in quantity nor quality; the cough not mitigated; or the dyspnœa diminished: on the other hand, they were, in four cases, manifestly increased: once epistaxis occurred, and twice hæmoptysis.

From the results of all his trials, Wolff is disposed to think, that creosote should be banished from our list of agents employed in phthisis; both as respects the radical and the palliative treatment;² but although they may not sanction us in placing much value on creosote in the treatment of phthisis, it may be improper to ostracise it altogether,³ as according to the testimony of others it would seem to have rendered essential service. Rampold and Späth assert, that they have derived advantage from it in confirmed phthisis where no inflammatory complication was present;—the expectoration and colliquative sweats being diminished under its use.

M. Pétrequin⁴ from his trials with it considered its effects to be more beneficial—as might be presumed—in incipient than in confirmed phthisis; but in no case did he observe any thing approaching the radical cures described by some. He indeed gives the preference to the tar water, (see *Aqua Picea*.)

¹ Hecker's neuen wissenschaft. Annal. B. i. H. 3.

² See, also, Köhler, in Rust's Magazin, B. xlv. and Amer. Journ. of the Med. Sciences. Feb. 1837, p. 497.

³ Riecke, Op. cit. S. 170.

⁴ Gazette Médicale de Paris, Nov. 1836.

15. In *bronchorrhœa* or that state of the bronchial mucous membrane, which consists in a profuse secretion without inflammation, the inhalation of creosote has been found of essential service.¹

16. *Rheumatism and Gout*.—The success, obtained by Reich² from a tincture of soot in gouty and rheumatic affections, and the probability that the efficacy might depend chiefly on the creosote it contained, induced him to prescribe this remedy internally in those diseases. He made the first trial upon himself. After exposure to cold he was attacked with lancinating pain in the whole of the right leg, for the removal of which the ordinary remedies were employed in vain; it yielded to the use of creosote given for nine days. He relates another case of rheumatism and one of atonic gout, in which creosote was equally successful. Marcus, of Hadersleben, recommends it in cases of rheumatism, unaccompanied by excitement of the vascular system, or tendency to congestion and febrile reaction. It is proper, however, to observe, that he combined other agents with it, so that his experiments are by no means decisive as to the efficacy of the creosote. Of the three patients, to whose cases he refers, one only was cured; the other experienced improvement. Karsten found none of the advantages, described by Reich in rheumatic and gouty cases, from its use. In a case of rheumatic headach, Tschepke found surprising advantage from frictions with creosote, and plugging the ear with cotton dipped into it. The creosote immediately excited acute pain, and some rubefaction of the skin; and as the burning ceased, the pain ceased along with it.

In Most's experience, lotions of creosote water greatly alleviated the pain of the joints in rheumatism and atonic gout.

17. In *vomiting* not arising from inflammation or other organic disease of the stomach, Elliotson³ found creosote very efficacious. Even in the Asiatic cholera and in sea sickness, it appeared to allay the vomiting. In various affections of the stomach, as in cardialgia and gastrodynia, it may be found useful.⁴ In cases of vomiting from nervous excitability it has been affirmed to excel all known medicines.⁵ After Dr. Elliotson had recommended it, Dr. Shortt tried it in about a dozen cases, and found it equally successful, as

¹ Elliotson, in *Med. Chirurg. Transact.* xix. 221. Lond. 1835.

² Hufeland's *Journal*, Jan. 1834, and *Revue Méd.* Mai, 1834.

³ *Medico-Chirurgical Transactions*, vol. xix. and *Lancet*, Aug. 20, 1836.

⁴ Riecke, *Op. cit.* S. 172.

⁵ Cormack, *Op. cit.* p. 133.

did also Prof. A. T. Thomson of London, Dr. Bodington of Erdington in Warwickshire, and many others. Dr. John Walker of Glasgow, in a case published by him¹ does not appear however to have been equally fortunate, and with Dr. Paris it entirely failed.² Our own success has been by no means as great as that of Dr. Elliotson. In many cases, indeed, it has developed irritability of the stomach, where it did not previously exist.

Dr. Elliotson admits that in large doses it seems to excite vomiting, and that when given in such quantities with a view to check it, no good, but evil, results from giving a large dose. As a preventive of sea sickness it has been highly extolled by Dr. Elliotson, and by Mr. A. B. Maddock.³

It has been administered also as an excitant to relieve gastrodynia and flatulence, and where hydrocyanic acid and creosote have been separately tried unsuccessfully, Dr. Elliotson recommends, that they should be combined.

18. Several portions of *tania* having been observed to be discharged after the administration of creosote, Kraus was induced to prescribe it as a powerful anthelmintic. This he did in numerous cases, and with the best success; from five to eight drops being given to adults with oleum ricini; or where the bowels were not freely opened with half a drop or a drop of croton oil.

19. In *diabetes mellitus*, creosote was first given by Berndt,⁴ and with striking success. One or two cases of the same kind are related by Gadolin; but Rehfeld used it without advantage. Dr. Elliotson agrees with Berndt in the opinion, that it is sometimes of use in diabetes, and may even be greatly instrumental in accomplishing a cure.⁵

20. Dr. Elliotson⁶ tried creosote in *nervous diseases*. In some cases of epilepsy, the paroxysms appeared to be rendered less frequent and more mild; but in the generality of cases, they returned with fresh violence. In some cases, the remedy had no influence on the disease; in others it appeared to aggravate it. In neuralgia great advantage was at times derived from it, although, here, again, it was frequently of no service. Dr. Elliotson also observed good

¹ Lancet, Dec. 19, 1835, p. 447. See also Mr. Taylor, Ibid, Aug. 15, 1835, and Dr. Macleod, in Lond. Med. Gazette, xvi. 598, and xvii. 653.

² Pharmacologia, 8th edit. append. Lond. 1833.

³ Amer. Journ. of the Med. Sciences, Feb. 1838, p. 496.

⁴ Kleinert's Repertorium, Jan. 1835, and Lancet, July 18, 1835.

⁵ Medico-Chirurgical Transactions, xix. 132-135. Lond. 1835.

⁶ Op. cit.

effects from it in hysteria, where there was no inflammatory complication; in spasmodic erethism of the nervous system, and in palpitation; and Dr. Herndon,¹ of Virginia, used it with much benefit as an inhalation in hysteric croup (thirty drops to the quart of hot water).

In asthma, dependent upon morbid excitability of the bronchial mucous membrane, Dr. Elliotson² found its inhalation to be often useful.

21. In two cases of *chronic glanders*, the same gentleman³ accomplished a cure in the course of a few weeks, by the sedulous use of an injection of a dilute solution of creosote (gtt. 1 ad aq. ʒj) thrown up the affected nostril; combining the treatment, in one of the cases, with the internal use of the remedy; and a similar case of success is given in a recent number of a British medical periodical.⁴

MODE OF ADMINISTERING.

The dose for internal use is one or two drops, given several times a day, in gum water.⁵ In cases of tapeworm, the dose should be larger. Some give it in emulsion, but this form is objectionable on account of the disagreeable taste. It is best administered in pill. Externally, it is at times applied pure; at others diluted,—commonly with water, with or without the addition of spirit of wine, or in the form of ointment. Carminati⁶ affirms, that oil and *mu-*cilage, when combined with it, render it milder, but that vinegar increases its action. Dr. Cormack,⁷ however, doubts the assertion in regard to vinegar. In three comparative experiments, which he made with a view of testing the justice of Carminati's conclusion, there was no apparent difference in the activity of creosote when given with acetic acid or alone. He was led to believe, however, that the addition of albumen caused it to act more powerfully, which, if true, is singular.

The inhalation of creosote vapour may be accomplished by dif-

¹ Amer. Med. Intelligencer, Mar. 15, 1838, p. 425.

² Op. cit.

³ Lancet, for June 20, 1833.

⁴ Ibid, Jan. 20, 1839, p. 145.

⁵ It may be well to remark, that the fluidram contains one hundred and fifty drops of creosote.

⁶ Op. citat.

⁷ Op. citat. p. 88.

fusing a few drops of creosote through water, or a mucilaginous liquid, in an ordinary inhaling vessel, or in the mode described under the head of Chlorine.¹

Pilulæ Creosoti.

Pills of Creosote.

- ℞. Creosot. ℥j.
Succ. glycyrrhiz.
Gum. galban. aa. ℥ss.
Pulv. rad. althææ, ℥ij.
Fiat massa in pilulas cxx. dividenda.

Dose.—Six pills four times a day. In consumption. REICH.

- ℞. Creosoti,
Succ. liquirit. aa. ℥i.
Pulv. rad. althææ, ℥ij.
Fiat mass. in pil. cxx. dividend.

Dose.—Five pills morning and evening, in atonic gout.
REICH.

Haustus Creosoti.

Creosote Draught.

- ℞. Creosot. ℥. iv ad x.
Misturæ camphoræ,
Infus. gentian. compos. aa. f. ℥vj.
M. fiat haustus.

BRANDE.²

Mistura Creosoti.

Mixture of Creosote.

- ℞. Creosot. gtt. v.
Mucilag. gum. arab. ℥iij.
Syrup. althææ, ℥j. M.

Dose.—A spoonful every three hours in hæmoptysis.

SANTINI.

Tinctura Creosoti pro Gingivis.

Tincture of Creosote for the Gums.

- ℞. Creosot. ℥j.
Spiritus vini rectificati, ℥ij. M.

¹ See page 107.

² Dictionary of the Materia Medica, p. 201. Lond. 1839.

As much of this to be added to cold water as is necessary to give it a piquant taste, with which the teeth may be washed and the mouth rinsed. Used in cases of fœtor of the mouth from carious teeth, and to limit the caries. BUCHNER.

℞. Creosot.
Alcohol. aa. ℥ss. M.

To be applied to carious teeth.

RADIUS.

℞. Creosot. p. i.
Alcohol. p. viij. M.

This is the ordinary strength of the tincture. Used where fractions of a drop of pure creosote are prescribed.

Lotio Creosoti.

Lotion of Creosote.

℞. Creosot. ℥ss.
Aquæ destillat. ℥v. M.

Used as a lotion in impetigo sparsa and itch.

WOLFF.

The author has occasionally found a lotion composed of f. ℥ss of creosote to Oj of water too irritating.

℞. Creosot. gtt. xij.
Aq. destillat. ℥ij. M.

To be applied by means of a hair pencil twice a day to inflamed eyelids. COSTER.

℞. Creosot. gtt. iv.
Aq. destillat. ℥ij. M.

In irritation of the gums.

FREMANGER.

℞. Creosot. ℥ss.
Gum. arab. ℥iss.
Aquæ camphor. ℥xss. M.

Used every two hours in cases of aphthous ulceration of the mouth. MAGENDIE.

℞. Creosot. gtt. x.
Aceti, ℥ij.
Aquæ fontis, ℥ij. M.

Used in cases of phagedenic ulceration, and to chancres ; applied by means of a camel's hair pencil. SHORTT.¹

Unguentum Creosoti.

Ointment of Creosote.

℞. Cerati,
Ol. amygdal. dulc. aa. ℥j.
Creosot. gtt. xxx. M.

A dressing in scrofulous caries.

FREMANGER.

The Unguentum Creosoti of the London Pharmacopœia is composed of half a fluidram of creosote to an ounce of lard.²

Linimentum Creosoti.

Liniment of Creosote.

℞. Creosot. gtt. v. — xx.
Ol. olivar. ℥ss. M.

To be rubbed two or three times a day on the diseased parts, in chronic herpes. CORNELIANI.

CUBEBAÆ.

SYNONYMES. Piper Cubeba, P. Cubebæ, P. Caudatum, Cubebs.

French. Poivre à queue, Cubêbe.

German. Kubebenpfeffer, Schwanzpfeffer.

Cubebs are the fruit of the piper cubeba, which grows in India, Java, Guinea, &c. *Sex. System*, Diandria Trigynia ; *Nat. Ord.* Piperaceæ. The corns of this plant have been long known in the shops ; and in the old Wirtemberg Pharmacopœia, they figure as calefacient, inciting, discutient, antinervous, and carminative agents, which seem to have a specific action in vertigo ; hence they obtained the name "Schwindelkörner" or "grains for vertigo." They had however fallen into oblivion, until they were re-introduced in modern times into practice, especially by the English physicians and surgeons.

The shell of the dried berry has a weak taste, but smells agree-

¹ Cormack, Op. cit. p. 112.

² Brande, Op. cit. p. 202.

ably; the kernel has a bitter aromatic flavour which is biting at first, but afterwards cooling. The corns were analysed by Trommsdorf and by Vauquelin;¹ but the most recent analysis is by Monheim.² He found, in 100 parts, of lignin 64.0; of extractive matter 6, of *Kubebin* 6, of a matter like wax 3, of green volatile oil 2.5; of yellow volatile oil 1.0, of balsamic resin—which, according to Vauquelin, is very analogous to the balsam of copaiba—1.5, and of chloride of sodium 15.5. [?] The woody matter reduced to ashes contained much carbonate and muriate of potassa and soda. The kubebin appeared to Monheim to be identical with the piperine, but to be united with an acrid soft resin.

EFFECTS ON THE ECONOMY.

In addition to the general excitant properties of the peppers, the action of cubebs is exhibited on the urinary and genital organs. Under their use, the secretion of urine is augmented, and it becomes of a darker colour, and assumes an aromatic odour. Cubebs have been advised, in modern times—*first*, in cases of gonorrhea, in which they have been esteemed a specific by many. Yet that which applies to the copaiba is equally applicable to the cubebs. Although the revulsive effect induced by both on the kidneys may mitigate the inflammatory condition of the lining membrane of the urethra, which constitutes gonorrhœa—in violent inflammatory cases, and in the early stages of ordinary cases, they may be injurious, and there are many cases on record in which bad consequences appear to have resulted from their improper administration. Still, there are many physicians who administer both them and the copaiba in every stage of the disease. Of 50 patients, treated by Mr. Broughton³ by the cubebs, 10 were cured in from 2 to 7 days; 17 in from 8 to 14; 18 in from 15 to 21; 1 on the 55th day; and in 4 only was no success obtained.

In the chronic stage of gonorrhœa, M. Ricord⁴ prescribes the cubebs in combination with the peroxide of iron, and in addition the patient is directed to inject, four times a day, a solution composed of aq. destillat. ℥viii. argent. nitrat. gr. ij.

It has been affirmed, that different evils have ensued from the use

¹ Mémoir. du Muséum, vi. 225.

² Riecke, Die neuern Arzneimittel, S. 176.

³ Medico-Chirurgical Transactions, xii. 1. Lond. 1822.

⁴ La Lancette Française, No. 33. Paris, 1838.

of cubebs; which ought to suggest care in their administration: for example,—ardor urinæ, fever, inflammation of the urethra, bladder and testicles, retention of urine, cutaneous eruptions, &c.¹

In the blennorrhœa of females the cubebs are equally extolled by many practitioners, as well as in leucorrhœa.² *Secondly*, Spitta found them very efficacious in old and obstinate cases of coryza, when given in the form of lozenges: they are said, likewise, to have been administered with advantage in defective audition, caused by a catarrhal affection of the Eustachian tube. *Thirdly*, Rosen found the chewing of cubebs very serviceable in cases of aphonia. *Fourthly*, They have been prescribed successfully in cases of chronic rheumatism. *Fifthly*, Pül³ gave them with striking advantage in intermittent fever. *Sixthly*, In India, they are regarded to be aphrodisiac.⁴

According to Dr. Paris, it is important to keep the bowels open during their use, for when hardened fæces are allowed to accumulate, the spice insinuates itself into the mass, and occasions excoriations in the rectum.⁵

MODE OF ADMINISTERING.

Cubebs are commonly given in the form of powder, and in doses of from 1 to 2 and even 4 drams, repeated once or oftener in the day. Lozenges, boluses, and electuaries, are likewise prepared of them, and by some a tincture has been recommended. In consequence of the disorder at times induced by them in the digestive function, Velpeau proposed that they should be given in the form of glyster, to the amount of one or two drams of the powder, suspended in five or six ounces of an oily vehicle, and this method has its advantages.⁶ To attain the same object, M. Dublanc, Junr., prepared an oleo-resinous extract, one-sixteenth part of the weight of which possessed equal virtues with one part of the cubebs; five grains, three times a day, acting like the ordinary quantity of the powdered cubebs.⁷

¹ Lond. Med. and Physical Journal, Mar. 1832, and Mérat & De Lens, Dict. Univers. de Matière Médicale, &c. Art. Piper Cubeba.

² Edinb. Med. and Surg. Journal, xviii. 319.

³ Recueil de Méd. Chirurg. et Pharm. Militaire, xvi.

⁴ Mérat & De Lens, Art. cit.

⁵ Brande, Dictionary of Materia Medica, p. 205. Lond. 1839.

⁶ Archives Générales de Médecine, xiii. 47.

⁷ Journ. de Chimie Médicale, iii. 491, and Journ. de Pharmacie, xiv. 40.

Electuarium Cubebarum.

Electuary of Cubebs.

℞. Piper cubeb. pulv. ℥ss.
Mellis despum. q. s.

Fiat electuarium.

Dose.—A tea-spoonful three or four times a day, in Catarrhus vesicæ, C. urethræ, &c. RADIUS.

℞. Balsam. copaib. ℥ivss.

Subige cum

Vitello ovi unius, et

Adde

Pulv. cubebar, ℥ivss.

Conserv. rosar. ℥ss.

M. fiat electuarium.

Dose.—A tea-spoonful three or four times a day. VOLT.

℞. Balsam. copaib.
Pulv. cubeb. aa. ℥ij.
Aluminis, ℥j.
Extract. opii, gr. v. M.

Dose—A dram night and morning in the pulp of a prune. The quantity may be rapidly increased to two drams morning and evening.

Trochisci Cubebarum.

Lozenges of Cubebs.

℞. Pulv. cubeb. ℥ij.
Balsam. tolut. gr. vj.

Admisce

Syr. balsam. peruv.

Succ. glycyrr. aa. ℥j.

Gum. arabic. q. s. ut fiat massa in trochiscos pond. gr. x. dividenda.

Used in coryza.

SPITTA.

Boli Cubebarum.

Boluses of Cubebs.

℞. Balsam. copaib.
Gum. arab. pulv. aa. ℥ij.
Aquæ flor. aurant. ℥ij.

Terendo bene mixtis adde

Cubebar. pulv. ℥ij.

Misce, et fiant boli No. vj.

Dose—One, three times a day.

HENSCHEL.

M. Labelonye¹ has recently proposed the following method for separating all the principles of the cubebs from the ligneous matter.

The cubebs, reduced to a coarse powder, are placed in an apparatus for displacement and exhausted by ether, which dissolves the wax, volatile oils and balsamic resin. The residue is submitted to the action of hydro-alcohol at 20° (.935), which dissolves the extractive principle and chloride of sodium. The alcohol and ether are separated by distillation in part, and separately. Evaporation of the hydro-alcoholic solution is then carried on in a water bath until it possesses the consistence of a soft extract, to which the ethereal product is added; the evaporation being continued for a short time, the ether is completely volatilised, and a strongly aromatic extract is obtained, as consistent as honey. This it is improper to subject any longer to the action of heat, on account of the contained volatile oils; the presence of which in all cases interferes with complete desiccation. One part of this extract is conceived to be equal to five of the cubebs.

This extract can be readily mixed with water by means of mucilage, and can be administered in potions, injections, &c.

The best form of exhibition, according to M. Labelonye is in lozenges, or in an emulsive syrup.

Trochisci Extracti hydro-alcoholici ætherei Cubebarum.

Lozenges of the ethereal hydro-alcoholic Extract of Cubebs.

℞. Ext. hydro-alcohol. æther. cubebar. ℥viiij.

Alcohol, Oij.

Solve et adde

Sacchar. alb. in pulv. ten. ℥j.

Ol. menthæ pip. gtt. xviiij.

Pour the mixture into flat vessels upon a stove, and allow the alcohol to evaporate at a moderate heat. When the mass is completely desiccated, reduce it to fine powder, and add a sufficient quantity of mucilage of gum tragacanth to form lozenges—18, 12, 9, or 6 grains each. Most persons, he says, can swallow with facility those weighing eighteen grains, and containing six grains of the extract; ten of these are equivalent to half an ounce of the powder.

¹ Bulletin Général de Thérapeutique, and Amer. Journ. of Pharm. 2d series, vol. 2. p. 316. Philad. 1837.

Syrupus Extracti hydro-alcoholici ætherei Cubebærum.

Syrup of the ethereal hydro-alcoholic Extract of Cubebs.

℞. Ext. hydro-alcohol. æther. cubebæ. ℥iij.

Suspende ope mucilaginis in

Aq. menthæ pip. ℥j.

Adde

Sacchar. alb. ℥ij. M.

Four ounces of this syrup contain two drams of extract, equivalent to ten of powdered cubebs.

Dose—A tea-spoonful.

M. Labelonye, envelopes the extract also in sugar, as in the ordinary sugar-plumb.

DELPHININA.

SYNONYMES. Delphininum, Delphinium, Delphinia, Delphium, Delphia, Delphinine, Delphine.

German.—Delphinin.

This alkaloid was discovered in 1819, by MM. Feneulle and Lassaigne,¹ and, almost at the same time, by Brandes,² in the seeds of the *Delphinium Staphisagria*, in which it is united with acetic acid. As a therapeutical agent, it has been chiefly recommended by Turnbull; but he did not employ it in its pure state.

METHOD OF PREPARING.

The plan recommended by Magendie³ is to boil a portion of the seeds of the delphinium, cleared of their coverings, and reduced to a fine paste, in a little distilled water; to pass the decoction through a linen cloth and filter. Pure magnesia is now added, and it is boiled for some minutes; the filtration is repeated; and the residues washed carefully and digested in highly rectified alcohol. On evaporating the alcoholic tincture, the delphinine is obtained in the form of a white powder, having some crystallised points.

¹ Annales de Chimie, tom. xi. xii. and Journal de Pharmacie, vi. 47 and 366.

² Schweigger's Journal der Chimie, xxv. 369.

³ Formulaire, &c.

This is esteemed the most simple mode ; but if a large quantity be required, the following plan is advised—on account of the time and patience necessary to decorticate the seeds.

Submit the uncleaned seeds, when well bruised, to the action of weak sulphuric acid. Precipitate the liquor by ammonia, and redissolve in alcohol the delphinine, which is still slightly coloured. To purify it, draw off the alcohol by distillation, dissolve the residuum in muriatic acid, and boil with magnesia.

The plan recommended by Couerbe, and adopted by Turnbull,¹ is to evaporate a saturated tincture of the seeds to the consistence of a thin extract, and then to treat it with water acidulated by sulphuric acid. This solution, when filtered, is to be precipitated by ammonia. The precipitate—after being freed from its water—is to be taken up with alcohol, and again reduced to the consistence of an extract, which is likewise to be dissolved in acidulated water ; to this solution, filtered, a small quantity of nitric acid is to be added, as long as any precipitate is thrown down. The liquid, freed from this precipitate, is again to be subjected to precipitation, by ammonia, and the powder dried. This is the *delphinine of commerce* ; but like veratrine, it is a compound substance, and consists of *resinous matter*, *staphysagrine* and *delphinine* ; the delphinine is obtained by treating the powder with ether, which takes up the delphinine, and leaves the staphysagrine.

When in a state of purity, delphinine is white, pulverulent, and devoid of smell ; but like veratrine, when applied to the mucous membrane of the nose, it occasions sneezing, along with an abundant secretion of mucus. Its taste is at first bitter, and afterwards acrid, and it acts upon animals in the same manner as—but more energetically than—the seeds whence it is prepared. It is very sparingly soluble in water, but yet in sufficient quantity to communicate a bitter taste to the fluid. In alcohol and ether it dissolves readily, and these solutions have the property of rendering syrup of violets green, and of restoring the blue colour of litmus, when reddened by acids. It combines readily with acids, and forms neutral salts, which are possessed of much bitterness and acidity, and it may be precipitated from solutions of these in the form of a jelly by the addition of an alkali.

¹ On the Medical Properties of the Natural Order Ranunculacæ, chapter 2. Lond. 1835.

EFFECTS ON THE ECONOMY.

From the experiments of Orfila¹ with this substance, it appears to belong to the class of acro-narcotic poisons. In the dose of about five grains it proves fatal to dogs; and the fatal result is more speedily induced when the delphinine is dissolved in weak acetic acid; the animal, in the latter case, dies in the space of from forty to fifty minutes. When diffused through water introduced into the stomach of a dog, and retained there by a ligature placed around the gullet, efforts to vomit supervened, with restlessness, giddiness, immobility, slight convulsions, and death in two or three hours. In this case, the mucous membrane of the stomach was generally found injected.

From his administration of delphinine and its salts, Turnbull concludes, that the pure alkaloid has little effect on the mucous membrane of the stomach and bowels. It may be given, he says, in some cases, to the extent of three or four grains a day, in doses of half a grain each, without exciting vomiting; in this quantity, however, it sometimes operates upon the bowels, but causes very little irritation. In most instances it acts as a diuretic, and occasions a considerable flow of pale urine. When taken to the extent of a few grains, it induces heat and tingling in various parts of the body, similar*to those produced by rubbing it upon the skin; and its other effects are very nearly the same as those of the salts of veratrine.

The preparations of delphinine have been used in the same diseases as those of veratrine, and they appear to exert a similar action: the test laid down by Turnbull, in the case of the veratrine, applies equally to the delphinine;—namely, that unless a solution of delphinine in alcohol, in the proportion of four grains to a dram, occasions a distinct sensation of heat and pricking, when rubbed for three or four minutes on the forehead, the specimen ought not to be used, as no beneficial effect would arise from its application. When rubbed upon the skin, it gives rise to a sensation of burning, not unlike that which manifests itself a short time after the application of a blister, but not to an unpleasant degree, unless the friction has been carried too far. The effects of the delphinine differ also from those of the veratrine in being generally more powerful and durable.

The diseases in which the delphinine has been chiefly used, like

¹ Nouveau Journal de Méd. x.; and Toxicologie Gén. i. 739.

the veratrine, are—*tic douloureux*, paralysis, and rheumatism. In the first of these, when the affection is seated in the tongue, or at the point where the infra-orbital nerve escapes from its foramen, the use of delphinine, according to Turnbull, is to be preferred, because it can be applied to the tongue, or rubbed on the gums, without occasioning irritation of the mucous membrane. He thinks it, also, upon the whole, better adapted for the treatment of paralytic cases than veratrine, but principally on account of the property it has “of exciting the circulation in the diseased part.”

MODE OF ADMINISTERING.

The manner of applying delphinine is the same as that recommended for veratrine. It may be used either in the form of ointment or in solution in alcohol, and the proportions to be employed, in either case, may vary from ten to thirty or more grains to the ounce, according to the severity of the affection, for the treatment of which it is prescribed. The duration of the frictions should also be the same, or until the pungent sensation, produced by the rubbing, exhibits itself.

DIOSMA CRENATA, (FOLIA.)

SYNONYMES.—*Barosma Crenata*, (folia;) *Agosmosma Crenatum* (folia;) *Bocchoe*, *Bocho*, *Bocho*, *Buchu Leaves*.
German.—*Buccublätter*; *Duftstrauchblätter*.

This plant is indigenous at the Cape of Good Hope. It belongs to the natural family *Rutaceæ*; class *Pentandria*, order *Monogynia*.

The smell of the leaves is penetrating and peculiar, but resembling that of rue and camphor. By some, it has been compared to that of the oil of juniper. The name appears to be derived from the smell,—*διος*, “divine,” and *οσμη*, “odour.” The taste of the leaves is aromatic, somewhat pungent, and, in the opinion of Buchner, resembling that of peppermint; without any particular bitterness, yet disagreeable. According to the analysis of Buchner, the most important constituents appear to be a volatile oil of a greenish yellow colour, a peculiar principle—*diosmine*, and a semi-

resinous substance. The diosmine is a very tenacious adhesive matter, similar to the Peruvian balsam, and can be drawn out in fine threads. It has the same smell as the leaves, only somewhat weaker; the taste is pungent and bitter. The semiresinous matter has a resinous lustre; is of a dark brown colour, becomes fluid when heated, and burns with a flame. Its odour is not remarkable: the taste is somewhat pungent and sourish.¹

EFFECTS ON THE ECONOMY IN HEALTH.

The Hottentots have long used the leaves of several varieties of *diosma* both internally and externally; but they give the preference to the *diosma crenata*. Through them its virtues became known to the European settlers. It was first brought to the notice of British practitioners by the notorious Richard Reece, who is more known for the part he took in the farce of Joanna Southcoat than for any thing else. In Germany, it was chiefly promulgated by Jobst, who published an extract from Reece's observations in the *Repertorium of Buchner*.²

Bardili instituted experiments for testing the action of the remedy on the healthy organism. It first acts as an excitant on the stomach, whence arises a feeling of increased heat in that organ, and the appetite becomes augmented; from the stomach, the excitement spreads to the vascular system; the heat of the body is increased; the pulse becomes more frequent, and the transpiration is favoured. It acts, likewise, on the urinary secretion; the urine is separated in larger quantity, contains flocculi, deposits a purulent (?) sediment, and exhales an aromatic odour. On the digestive function, it seems to produce somewhat of a constipating effect. Bardili thinks, that he has also witnessed some narcotic operation in his experiments.

The same results were produced by the *diosma* on animals.

EFFECTS ON THE ECONOMY IN DISEASE.

The inhabitants of the Cape administer this agent as a stomachic, and the Dutch physicians give it with success in indigestion. It is said, also, to have afforded essential service in chronic cases of

¹ See *Journal de Chimie Médicale*, iii. 13, and *Journal de Pharmacie*, xiii. 106.

² *Band. xxii. S. 51.*

rheumatism and arthritis. Autenrieth extols it in rheumatic pains, which have had their foundation in repelled itch; and its utility in chronic rheumatism has been confirmed by Jackson and others. It has been extolled, moreover, in hæmaturia, calculous pains, and in irritated and suppurative conditions of the bladder, urethra, and prostate. We have repeatedly administered it, but have observed no other effects than those of a moderate excitant and tonic. Reece found it efficacious in incontinence of urine, and in catarrhus vesicæ; and he gave it—united with tincture of cubebs—in spasmodic stricture of the urethra, gonorrhœa, swellings of the prostate, and impotence.

By the inhabitants of the Cape of Good Hope, the buchu leaves are often applied externally, both in the form of liniment and of baths, in luxations and rheumatic pains,—as well as of fomentations and cataplasms, in wounds, especially the contused.

It may be remarked, that this—like almost every similar remedy—has been given in cholera; and the Riga physicians assert, frequently with favourable results.

MODE OF ADMINISTERING.

The dose of the powder is ʒij in the day; this, at least, is the common dose at the Cape. The infusion necessarily contains more of the volatile oil than the decoction; but, on the other hand, the latter has more of the diosmine: as respects their action, however, there is not much difference. A vinegar, oxymel, liniment, extract, and tincture of the diosma have been advised.

The Dublin Pharmacopœia has an *infusum buchu*, (ʒss of the leaves to ℥ss of water); dose ʒiiss: and a *tinctura buchu* (ʒij of the leaves to ℥j of proof spirit); dose ʒij or ʒiij.

Infusum Diosmæ Crenatæ Compositum.

Compound Infusion of Buchu.

℞. Fol. diosm. crenat.
 — uvæ ursi, aa. ʒss.
 Aq. fervid. ʒviiij.

Digere leni calore in vase clauso per semihoram. Colaturæ adde
 Syrup. seneg. ʒss.

Dose.—One or two spoonfuls every two hours, in blennorrhœa, and in atony and paralysis of the bladder.

CLARUS.

ELECTROPUNCTURA.

SYNONYME.—Electropuncture.

This consists in a union of acupuncture with electricity. The idea of the conjunction appears to have originated with Berlioz; but Sarlandière was, doubtless, the first who put it in practice, although J. Cloquet has contested the priority with him—a matter, by the way, as in all such cases, of extremely small moment. The operation consists in employing acupuncture in the usual way, either with a single needle, or with two or more; and making a communication between them and the prime conductor of an electrical machine; or they may be made to form part of the circuit in the discharge of a Leyden jar. In this way, the electrical influence may be graduated from the simple aura to a full shock. Sarlandière appears to have employed electropuncture with great success, but he restricts its use to rheumatic or neuralgic pains, uncomplicated with organic mischief or inflammation: when such complications exist, he advises bloodletting and general antiphlogistics to be premised.¹

Guersent thinks it better, in all these cases, to use simple acupuncture, and only to employ electropuncture, when the first proves to be inadequate, as in paralysis, and in tremors produced by the immoderate use of mercury;—in all cases, indeed, in which the malady depends on a diminution of the nervous energy. A case of success from its use, in paralysis of the right arm, in which voluntary motion and sensibility were destroyed, has been recently published.² The patient was, in the first instance, subjected to the use of blisters and moxas along the course of the radial nerve, from which he obtained some advantage. The remedy which succeeded best, however, was electropuncture along the nerves from the shoulder to the hand. At first, the punctures were but little felt, but afterwards they were very painful. The sensibility, mobility, and strength of the fingers and hand gradually returned; and, three months after his admission, the patient left the hospital completely cured.

Magendie affirms, that he has treated many cases of incomplete

¹ E. Gräfe, Art. Electropunctura, in *Encyclopäd. Wörterb. der medicinisch. Wissensch.* x. 550. Berlin, 1834.

² *La Lancette Française*, Dec. 20, 1836; and *American Med. Intelligencer*, Oct. 16, 1837, p. 265.

amaurosis with great success by this agency. He employed it, however, in the form of what has been more properly termed galvanopuncture; by fixing a needle in the frontal nerve, and another in the superior maxillary, and making these communicate respectively with the poles of a galvanic pile of twelve pairs of plates, each six inches square. Whenever the contact was made, the patient experienced a painful commotion in the course of the nerves, and at the bottom of the orbit; the light became better appreciated, and the pupil contracted.

We have frequently used both electropuncture and galvanopuncture in rheumatic and neuralgic affections; but do not think the advantages were more marked than those of simple acupuncture, whilst the suffering from the operation was certainly greater.

In cases of asphyxia, galvanopuncture has been proposed to arouse the dormant energies. The effect of electricity, in the different forms in which it is adopted in medicine, on the functions of sensibility and muscular contraction, could not fail to suggest it early to observers as a fit agent for this purpose; but it is rarely at hand, and, therefore, seldom available. J. P. Frank, Thillaye,¹ and others have highly recommended it;—the latter gentleman, on the strength of numerous experiments on animals. As the object, in these cases, is to arouse the respiratory muscles to action, the electric shock may be passed through the shoulders or the chest in any direction. Neither common nor galvanic electricity is possessed of any power to restore the action of the involuntary muscles. We have frequently attempted to re-excite the action of the heart, intestines, fibres of the uterus, &c. soon after the cessation of respiration and circulation, by means of the galvanic stimulus, but without the slightest success, although the voluntary muscles responded to it energetically. Besides, were the action of the heart re-excited by it, this could be but momentary. A necessary stimulating agency to that viscus is distension by the proper fluid, and unless the respiratory movements were restored, and conversion of venous to arterial blood effected, so that the latter could reach the left heart, the action of that organ could not be maintained. Every attempt, therefore, is properly made to restore the action of the respiratory muscles, so that hæmatosis may be accomplished.²

¹ Archives Générales de Médecine, xii.

² Art. Asphyxia, by the author, in the American Cyclopædia of Practical Medicine, part x. p. 486, Sept. 1836.

M. Leroy d'Etiolles¹ has suggested galvanopuncture in a manner which, at the first aspect, appears most formidable; but which is really less so than it seems to be, in consequence of the impunity with which fine needles can be made to penetrate, as we have seen,² even the most important organs. He introduced an acupuncture needle on each side between the eighth and ninth rib, until it reached the fibres of the diaphragm. He then established a galvanic current between the needles by means of a pile of twenty-five or thirty pairs of plates, an inch in diameter. The diaphragm immediately contracted, and an inspiration was accomplished. He then interrupted the circle, when the diaphragm, urged by the weight of the abdominal viscera, and aided by gentle pressure made on the abdomen by the hand, returned to its former position, and an expiration was effected. In this way, the two respiratory acts were made to succeed each other, and regular respiration was reinduced. A continuous current was likewise employed in some cases, but the respiratory movements were irregular, and nothing like natural respiration resulted.

Leroy tried his method on animals asphyxied by submersion, and when they had not been under water more than five minutes, they were often restored.

These experiments were witnessed by Magendie.³ On different occasions, M. Leroy asphyxied animals of the same kind, and apparently of the same strength, and whilst those that were left to themselves perished, those that were treated by galvanism recovered.

As an aid, therefore, to pulmonary insufflation, and an important one, galvanism, combined or not with acupuncture, might be advantageously employed in asphyxia, but as has been already remarked, it can rarely be available. Certainly no time should be lost in adopting the other energetic and indispensable measures that are demanded.⁴ It has been recommended, that as only a very small apparatus is necessary, batteries, consisting of a few plates, might be kept wherever there are station-houses for the reception

¹ Magendie's *Journal de Physiologie*, tom. vii. 1827; tom. viii. and tom. ix; also *Recherches Expérimentales sur l'Asphyxie*, Paris, 1829; and Bourgeois, *Observations sur la possibilité du retour à la vie dans plusieurs cas d'Asphyxie*. Paris, 1829.

² See Art. Acupuncture.

³ *Journal de Physiologie*, ix.

⁴ See Art. Asphyxia, Op. cit. p. 486.

of persons in a state of asphyxia.¹ The suggestion is good; and they might also with propriety form a part of the cabinet of apparatus of the private practitioner; but whilst an assistant is preparing the apparatus for action, the practitioner should be assiduously engaged in applying other means of resuscitation.²

EMETINA.

SYNONYMES. Emetinum, Emetia, Emeta, Emetine.
German.—Emetin, Brechstoff.

In the year 1817, MM. Pelletier and Magendie,³ by a series of chemical and physiological experiments, discovered, that the various kinds of ipecacuanha are indebted for their emetic properties to a peculiar substance to which they gave the name Emetine.

This substance possesses the emetic power in a very concentrated state, and has neither the disagreeable smell, nor the nauseous taste of the ipecacuanha. They considered, therefore, that it might be advantageously substituted for ipecacuanha on all occasions.

There are two varieties of the active principle—the *coloured* and the *pure*, which, as Magendie remarks,⁴ bear the same relation to each other as moist sugar does to the white and crystallised. Ipecacuanha, derived from the cephaelis ipecacuanha, contains the most emetine.

Emetine has been received into many of the Pharmacopœias, as the Parisian, Batavian, Hannoverian, &c.

MODE OF PREPARING.

1. *Coloured Emetine.*—Powdered ipecacuanha is digested with ether at 60° (720) to dissolve the fatty matter, whence it derives its disagreeable odour, and which possesses no emetic virtue. When

¹ Kay, in Edinb. Med. and Surg. Journ. xxix. and in his work on Asphyxia. Lond. 1834.

² See Most, Art. Galvanismus, in Encyklopäd. der gesammten medicin. und chirurgisch. Praxis, u. s. w. 2te Auflage. Leipz. 1836.

³ Journal de Pharmacie, iii. 145, and Magendie's Formulaire pour la préparation de plusieurs nouveaux médicamens, &c.

⁴ Op. cit.

the powder yields nothing more to the ether, it is exhausted by means of alcohol, the alcohol is then evaporated in a water-bath, and the residue is dissolved in cold water. It thus loses some of the wax, and a little fatty matter, which still adhered to it; it is then only necessary to mix it with the carbonate of magnesia, whereby it loses its gallic acid,—to redissolve it in alcohol, and to evaporate to dryness.

By a similar process, M. Boullay obtained from the roots, leaves, flowers, and seeds of the *viola odorata*, an active, alkaline, bitter and acrid principle, similar to emetine from ipecacuanha, which he denominates *emetine of the violet, indigenous emetine* or *violine*. According to Orfila, it possesses highly poisonous qualities.¹

2. *Pure emetine*.—This is obtained by substituting calcined magnesia, for the carbonate used in the process just described, in such quantity, that the acid existing in the liquid may be neutralised, and that which is associated with the emetine be separated from it.

The precipitate of magnesia and emetine must now be washed with a little very cold water, to remove the colouring matter, which is not combined with the magnesia; and after being carefully dried it must be treated with alcohol, which dissolves the emetine. The emetine, obtained by the evaporation of the alcohol, must then be dissolved in a dilute acid, and treated with pure animal charcoal. After this purification, the emetine must be precipitated by a salifiable base.

The waters, used to wash the magnesian precipitate, still contain emetine, which may be separated by a second series of operations.

Coloured emetine appears in the form of reddish brown, transparent scales; is almost inodorous, and of a bitter, but not nauseous taste. It can withstand the heat of boiling water without experiencing change; is very deliquescent, soluble in water, and not crystallisable.

Pure emetine has a white and frequently a somewhat yellowish appearance; is pulverulent, and does not deliquesce, like the former, in the air. In cold water, it is but little soluble; more so in warm. In ether and alcohol it dissolves readily. Its taste is feebly bitter. It has an alkaline reaction, is dissolved by all the acids—diminishing their acidity, but without wholly neutralising them. With the acids it forms crystallisable compounds, from which

¹ Journal de Pharmacie, Janvier, 1824.

it may be precipitated by galls, which are the best agents for obviating the effects of emetine, when given in too large a dose.

EFFECTS ON THE ECONOMY IN HEALTH.

According to Magendie,¹ from half a grain to two or three grains of coloured emetine given to dogs and cats, excited vomiting, at times followed by a long sleep. In larger doses, ten grains for example, it occasioned, in dogs, repeated vomiting, after which the animal fell asleep, and generally died in twenty-four hours. On dissection, violent inflammation was found in the lungs, and in the mucous membrane of the stomach and bowels throughout their whole extent. The effects were the same when the emetine was injected into the jugular vein, or absorbed from any part of the body. In a healthy man, two grains of coloured emetine, taken fasting, produced repeated vomiting, to which succeeded decided disposition to sleep. Even a quarter of a grain at times induced nausea and vomiting. It acted also on the bowels.

The effects of pure emetine are analogous, but more powerful; two grains were sufficient to kill a strong dog.

EFFECTS ON THE ECONOMY IN DISEASE.

The same effects are induced on the morbid as on the healthy economy.

Magendie recommends the administration of the coloured emetine—as the pure is much too dear—in every case where it is desirable to excite vomiting, and especially where ipecacuanha is indicated. It has not, however, been much used, except by Magendie himself. Lerminier, who prescribed it, says that one or two grains of coloured emetine are equal in strength to from ten to twenty of ipecacuanha; but that he observed no difference in their operation. The obvious advantages it possesses are—the convenient and agreeable form under which it may be administered, and the circumstance, that several spurious sorts of ipecacuanha are frequently passed off in commerce, and occasion, in consequence, considerable disappointment in the mind of the practitioner. The employment of the active principle of course precludes these inconveniences.²

¹ Op. citat.

² Clinique Médicale, vol. i. Paris. 1823.

Prollius, of Wolfhagen, has frequently administered the pure emetine, which he recommends as a substitute for ipecacuanha, on the grounds above mentioned; and he properly adds, that the price is not a matter of so much moment as it might seem to be by reason of the very small quantity required to produce the desired effects.

MODE OF ADMINISTERING.

To produce vomiting, three grains of the coloured emetine may be dissolved in any vehicle, and given in divided doses, at short intervals. Of the *pure* emetine, Magendie found, in a man eighty-five years of age, one sixteenth of a grain sufficient to induce vomiting. He remarks, however, that the man was easily made to vomit. Prollius found the medium dose of the *pure* emetine, for an adult, to be from two sixteenths to three sixteenths of a grain; sometimes it was requisite to give another sixteenth. Very rarely was it necessary to give more than four sixteenths, or one fourth of a grain. As, on account of its sparing solubility, pure emetine, when given alone, might be restricted in its operation, Prollius adds an equal portion of tartaric acid and a little sugar.

Mistura Emetinæ Vomitoria.

Emetic Mixture of Emetine.

- ℞. Emetin. colorat. gr. iv.
 Infus. fol. aurant. ℥ij.
 Syrup. flor. aurant. ℥ss. M.

Dose.—A dessert-spoonful every half hour; to excite vomiting. Any simple distilled water and syrup may be substituted for those of the orange flowers.

MAGENDIE.

Pastilli Emetinæ Pectorales.

Pectoral Lozenges of Emetine.

- ℞. Emetin. colorat. gr. xxxij.
 Sacchar. alb. ℥iv.

Mucilag. q. s. ut fiant pastilli, pond. gr. ix sing.

These lozenges are commonly coloured red, to distinguish them from those of ipecacuanha. A little carmine may be added for this purpose.

Given in cases of catarrh, hooping-cough, chronic diarrhœa, &c.

Dose.—One pastile occasionally.

MAGENDIE.

Pastilli Emetinæ Vomitorii.

Emetic Lozenges of Emetine.

- ℞. Emetin. colorat. gr. xxxij.
 Sacch. alb. ℥ij.
 Mucilag. q. s. ut fiant pastill. pond. gr. xviiij.

Dose.—One of these lozenges taken fasting is generally enough to make a child vomit: three or four are required for an adult.

MAGENDIE.

Mistura Emetinæ Purificatæ Vomitoria.

Emetic Mixture of Purified Emetine.

- ℞. Emetin. purif. in pauxil. acid. nitr. solut. gr. j.
 Infus. flor. tiliæ, ℥iij.
 Syrup. althææ, ℥j. M.

Dose.—A dessert-spoonful to be given every quarter of an hour, until vomiting is induced.

MAGENDIE.

EUPHORBIA LATHYRIS.

SYNONYMES.—Cataputia Minor, Lathyrus, Tithymalus Latifolius, Caper Spurge, Garden Spurge, Mole Plant.

The oil of this plant, which is indigenous in France, and is monœcious, has been recently recommended in medicine. Although the euphorbia is not a native of this country, it is sometimes met with in situations where it has the appearance of growing wild. It is easily cultivated, and in some parts of New Jersey, where it has been introduced, is found in abundance.¹

The oil, obtained from the seeds, resembles in colour the oleum ricini, but is less dense. It has no odour when newly prepared, and no perceptible taste. It is soluble in sulphuric ether, insoluble in alcohol, and forms a soap with the alkalies. Its s. g. is .920.

EFFECTS ON THE ECONOMY IN DISEASE.

Dr. Charles Calderini found, that, in the dose of from four to eight drops, it acted as a cathartic on the adult, without occasioning

¹ Scattergood, in Philad. Journ. of Pharmacy, iv. 124, Philad. 1833. See, also, Journal de Chimie Médicale, ii. 178.

colic or tenesmus. In half the quantity, it proved cathartic to children. He gave it in sugared water, or in the form of an emulsion; and was of opinion that it might be advantageously substituted for castor oil, especially for children.

After him, it was employed by M. Grimaud, and subsequently by M. Bally,¹ who carried the dose as far as ten drops.

Louis Frank² has suggested its employment in cases of tænia, hysteralgia, ascites, &c.

It would appear from the remarks of Mr. Scattergood, that the oil, obtained from the beans grown in this country, does not possess the mild qualities ascribed to the European article. Six, eight, ten, and twelve drops were given to several individuals as a cathartic; and, although administered in conjunction with aromatic oils, and in one or two cases with an alkali in the form of soap, it invariably produced nausea, and even vomiting. Mr. Scattergood adds, that he has been informed by the manufacturer, Mr. Thomas Bellangee, of Crosswicks, New Jersey, that when administered in small quantities, and repeated at intervals of half an hour or an hour, it operates on the bowels freely as a cathartic, without producing much nausea.

Pichonnier³ has proposed the following formula for a cathartic mixture.

Mistura Olei Euphorbiæ.

Mixture of the Oil of Euphorbia.

- ℞. Olei euphorb. lathyr. gtt. viij.
 Pulv. gum. arab. ʒj.
 Sacchar. ʒij.
 Aquæ distillat. ʒiij. M.

¹ Journal Universel des Sciences Médicales, xli. 254.

² Journal de Pharmacie, xi. 273; and Mérat & De Lens, Dict. de Mat. Méd. iii. 183. Paris, 1831.

³ Journal de Chimie Médicale. Paris, 1827.

FERRI PRÆPARATA.

SYNONYMES. Preparations of Iron.

French.—Les Préparations de Fer.

German.—Eisenpräparate.

I. FERRUM ARSENIATUM.

SYNONYMES. Arsenias Ferri; Ferrum Arsenicicum Oxydulatum.

French.—Arséniate de Fer.

German.—Arsensaures Eisenoxydul, Arseniksaures Eisenoxydul.

This preparation has been recommended by Mr. Carmichael,¹ who often applied it externally in cases of cancerous ulcers. Naturally, it presents itself in small, clear, bluish green crystals, of a regular octaëdral shape, and is called *scorodite*. Artificially, it is formed by double decomposition.

METHOD OF PREPARING.

Glaser gives the following formula for its preparation. Eight ounces of semivitrified white arsenic, sprinkled with a little spirit of wine and reduced to fine powder, are mixed with as much purified saltpetre. The mixture is placed in an uncovered Hessian crucible, which should only be half filled with it, and then be placed in a wind furnace. At first, a slight degree of heat is applied, under which the mass soon melts, giving off copious red fumes, the inhalation of which should be carefully avoided. The process had better, therefore, be carried on in the open air, or in a laboratory that has a chimney with a good draft. When the mass no longer gives off red fumes, and flows tranquilly, the crucible must be carefully removed from the fire, the contents be suffered to cool somewhat, and boiling distilled water be poured upon them: under active boiling they will dissolve altogether. Hot water, sufficient to fill the crucible, is now added, and the whole is allowed to remain at rest for twenty-four hours; at the expiration of which time a considerable quantity of beautiful crystals of acid arseniate of potassa is found on the sides of the crucible. The fluid, holding the salt in solution, is now filtered into a clean porcelain or glass

¹ An Essay on the Effects of the Carbonate and other Preparations of Iron upon Cancer, 2d edit. Dublin, 1809.

vessel ; the crystals are collected, dried carefully in the shade, and put away amongst the poisons as the *Arsenias potassæ acidus*.

The fluid poured from the crystals and filtered is now diluted with distilled water, and a solution of pure sulphate of iron added thereto so long as any precipitate is thrown down. The bluish green precipitate, insoluble in water, is the *ferrum arseniatum*, which must be collected on a filter, washed and dried in the shade. The process must be conducted with the greatest care, and the vessels used be cautiously cleansed or broken, for fear that mischief may arise. In these chemical operations, the acid of the saltpetre is decomposed by being heated with the arsenious acid or white arsenic, a part of its oxygen is taken by the latter, and arsenic acid is thereby formed, which unites with the potassa of the saltpetre and forms acid arseniate of potassa ; the nitric acid being converted into nitrous acid is given off in the form of red fumes : by admixture of a solution of sulphate of iron with the solution of the acid arseniate of potassa, a double decomposition ensues, the result of which is the formation of sulphate of potassa and arseniate of iron, which last, being insoluble, falls to the bottom of the vessel.

EFFECTS ON THE ECONOMY.

According to Carmichael, this preparation acts more powerfully on the vitality of cancerous formations than any other agent, and the dead slough caused by it is much deeper than that caused by the application—which was at one time so much celebrated—called “Plunket’s caustic.” He allows, however, that the greatest caution should be observed in its use. Of late, he has employed a compound of the arseniate of iron with phosphate of iron ; half a dram of the former to two drams of the latter. This mixture must be applied very thin by means of a camel’s hair pencil, and not over the whole surface of the ulcer when it is extensive.

MODE OF ADMINISTERING.

The compound just mentioned may be applied in the form of ointment, prepared in the following manner:—

Unguentum Ferri Arseniatis Compositum.

Compound Ointment of Arseniate of Iron.

- ℞. Ferri arseniat. ʒss.
 ——— phosphat. ʒij.
 Ung. cetacei. ʒvi. M.

This ointment must be spread on lint and applied to the ulcer. Werneck gives it the preference over all the usual arsenical preparations. The arseniate of iron has likewise been administered internally in cancerous affections. The following formula may be used.

Pilulæ Ferri Arseniati Compositæ.

Compound Pills of Arseniate of Iron.

℞. Ferri arseniat. gr. iij.
 Extract. gentian. ʒj.
 Pulv. glycyrrhiz. ʒij.
 Syrup. cujusvis q. s. ut fiat

Massa, in pilulas xlviij dividenda.

Dose.—One, three times a day.

II. FERRUM BROMATUM.

SYNONYMES.—Bromated, or Bromide of, Iron;—in solution, Hydrobromate of Iron, Ferri Hydrobromas.

French.—Bromure de Fer.

German.—Bromeisen.

METHOD OF PREPARING.

This preparation is made by heating equal parts of bromine and iron filings under water. As soon as the fluid becomes of a greenish color it is filtered, and evaporated to dryness: the reddish residue—again dissolved in water and evaporated—is the bromide of iron. It has a brick-red colour; dissolves readily in water, is deliquescent in the air, and has a very styptic taste.¹

EFFECTS ON THE ECONOMY AND MODE OF ADMINISTERING.

Magendie has prescribed it successfully in cases, in which the preparations of bromine have been indicated. (See *Brominum*, p. 88.) He recommends the following formula.

¹ Magendie, *Formulaire pour la préparation, &c., de plusieurs nouveaux médicamens*, dernière édit.

Pilulæ Ferri Bromati.

Pills of Bromide of Iron.

℞. Ferri bromat. pulv. gr. xij.

Confect. rosar. gr. xvij.

Gum. arab. gr. xij.

Fiat massa in pilulas xx dividenda.

Dose.—Two, morning and evening.

MAGENDIE.

℞. Ferri bromat. ʒj.

Extract. glycyrrhiz. q. s.

ut fiat massa in pilulas lx dividenda.

Dose.—One or two, morning and evening, in cases of scrofula and hypertrophy—of the uterus especially.

WERNECK.

III. FERRUM CARBONATUM PRÆCIPITATUM.

SYNONYMES.—Ferri Carbonas Præcipitatus, F. Subcarbonas, Ferrum Carbonicum Oxydulatum, Oxydum Ferri Fuscum, Deuto-Carbonas Ferri Fuscus, Crocus Martis Aperiens, Ferri Sesquioxylum, Subcarbonate of Iron, Sesquioxide of Iron, Peroxide of Iron.

French.—Souscarbonate de Fer, Safran de Mars Apéritif.

German.—Kohlensaure Eisenoxydul.

This preparation, which is officinal in the British, American, and other pharmacopœias, is formed by adding a solution of carbonate of soda to a solution of sulphate of iron: the precipitate is the carbonate, or subcarbonate, or—as it is now called in the London Pharmacopœia—the sesquioxide of iron, which must be washed with water, and dried.

EFFECTS ON THE ECONOMY.

The precipitated carbonate of iron possesses the properties of the chalybeates in general, and has been highly recommended as a tonic, wherever such remedies are indicated. We introduce it here, mainly on account of the favour which it has received, of late years, as a remedy for neuralgia. Thirty years ago, its use was strongly advised in cancer and carcinomatous ulcerations of the uterus, by Mr. Carmichael;¹ and, subsequently, by Rust, Voelker,

¹ An Essay on the Effects of the Carbonate and other Preparations of Iron upon Cancer, 2d edit. Dublin, 1809.

and Kopp; as well as in a case of lupus of the ala nasi, by Key;¹ but, in similar cases, it proved unsuccessful in the hands of Clarke, El. Von Siebold, Meissner, Richter, and others.² In chronic nervous diseases, of a spasmodic nature, and especially in tic douloureux of the face, it was first highly extolled by Mr. Benjamin Hutchinson, about twenty years ago,³ who published several cases of cure effected by its agency. Soon afterwards, cases, equally fortunate in their termination, were published by various observers, by Drs. A. T. Thomson,⁴ Stewart Crawford,⁵ R. Macleod,⁶ Mr. J. E. Beale,⁷ and many others, and its efficacy is now almost universally admitted. Dr. Rowland⁸ has often witnessed the most happy results from its exhibition, even after various powerful medicines had been tried in vain.

Dr. Elliotson⁹ published several cases, in which the remedy, in large doses, had been efficacious; and he remarks, that true chronic neuralgia, not arising from cold, and coming on in a violent, stabbing, plunging form, aggravated by the least shake of the patient, and by touching the surface, is best treated by the subcarbonate of iron. He observes, however, in a recent publication,¹⁰ that he does not recollect that he ever cured the disease, but in almost every case improved it, and caused it to disappear for a time. In one of the severest cases of neuralgia, under the form of hemicrania, which we ever witnessed, and which had rendered the patient's life miserable for years, the subcarbonate of iron, in large doses, proved, in our hands, entirely successful. The patient had been bled repeatedly; and when we saw her, she was under the most favourable circumstances for the exhibition of the remedy, with the surface pale and cool; the pulse small; complaining much of debility, and yet suffering under the most intense head-

¹ *Lancet*, xiv. 92.

² Osann, in *Encyclopäd. Wörterb. der medicinisch. Wissenschaft*. x. 424. Berlin, 1834.

³ Cases of Tic Douloureux successfully treated. Lond. 1820.

⁴ *Medical and Physical Journal*, Feb. 1823.

⁵ *Ibid.*

⁶ *Ibid.* June, 1823.

⁷ *Ibid.* Sept. 1823.

⁸ *Treatise on Neuralgia*, by Richard Rowland, M. D., p. 84. Lond. 1838; and the reprint in the editor's *American Medical Library*.

⁹ *Medico-Chirurgical Transactions*, xv. 161.

¹⁰ *Principles and Practice of Medicine*, &c. by John Elliotson, M. D.; with Notes, &c. by Nathaniel Rogers, M. D. p. 507. Lond. 1839.

ach, which the least light and noise rendered almost intolerable ; yet, after she had persevered in the use of the remedy for a month, in large doses, the symptoms gradually disappeared, and she has since remained entirely well. It need scarcely be said, that where plethora exists, or febrile irritation supervenes, it must be removed ; the subcarbonate rarely, however, disagrees with the stomach, and where it does, the inconveniences are removed by the addition of an aromatic, or the administration of a cathartic.

The subcarbonate of iron, in large doses, has, likewise, been found a valuable agent in a kindred condition of the nervous system—chorea. Dr. Elliotson¹ affirms, that he has had—he should suppose—forty cases, in succession, all cured by it ; but perseverance in its use is demanded, the affection generally disappearing when the remedy has been given about six weeks or two months ; but in some obstinate cases, it has been necessary to continue it for twelve weeks.

Like other tonics, it has been prescribed in intermittents, and not long ago, M. Gimon,² physician at Thouars, published two cases, elucidative of the effects of large doses in long protracted intermittents, complicated with ascites and enlargement of the spleen. One of these occurred in a boy nine years old, and the other in a young man of twenty-one. Both had taken the sulphate of quinine in large doses, but ineffectually. To the former, he prescribed twelve grains of the subcarbonate in the twenty-four hours, augmenting the dose by six grains daily. The treatment was commenced in the latter end of July, 1835, and the quantity taken in the day was pushed progressively to one ounce. In six months, the traces of ascites and splenocèle had disappeared, and the cure was complete. The medicine was discontinued by gradually diminishing the dose. In the second case, the same dose was prescribed, in the first instance, and it was ultimately carried to six drams, with complete success.

More recently, still, Dr. Steyman³ has recommended the carbonate of iron for the treatment of hooping-cough, in the dose of half a grain at the least, to be taken every three hours with sugar, and increased to as many grains as, and more than, the number of years of the child's age. It should not, he advises, be administered

¹ Op. citat. p. 515.

² Journal des Connoissances Médico-Chirurgicales, Mai, 1837.

³ Medicin. Correspondenz-Blatt, and Gazette Médicale de Paris, June 20, 1838.

in the first stage of the disease; and, in all cases, should be preceded by an emetic.

The great efficacy of this preparation—as of every tonic—in diseases that are paroxysmal, appears to consist in the new impression which it makes upon the nerves of the stomach, and, through them, upon those of the whole system; but to effect the revulsion to the requisite extent, it appears to be necessary—as in the cases of the artemisia and the indigo in epilepsy—to keep up the effect of the remedy by gradually increasing the dose.

MODE OF ADMINISTERING.

The dose of the subcarbonate of iron, in cases of neuralgia and chorea, should be large. Mr. Hutchinson prescribed it in the quantity of ʒss to ʒij twice a day; but where it fails to remove the complaint in those doses, Dr. Elliotson recommends, that it should be increased gradually to one or two ounces. We have never found it necessary to carry it so high. The best vehicle is molasses. The following formulæ have been recommended.¹

Pulvis Ferri Sesquioxidi—(P. Ferri Carbonati Præcipitati.)

Powder of Sesquioxide of Iron.

℞. Ferri sesquioxidi, gr. x.

Pulv. cinnam. comp. gr. v.

M. fiat pulvis mane et meridie sumendus.

Boli Ferri Sesquioxidi.

Boluses of Sesquioxide of Iron.

℞. Ferri sesquioxidi, gr. x.

Pulv. valerianæ, ʒss.

Syrup. zingib. q. s.

Fiat bolus.

Pilulæ Ferri Sesquioxidi.

Pills of Sesquioxide of Iron.

℞. Ferri sesquioxidi,

Extract. anthemid. aa. ʒss.

Misce et divide in pilulas xij, quarum sumat binas ter quotidie.

℞. Ferri sesquioxidi, ʒj.

Pilul. aloes cum myrrha, ʒss.

Misce et divide in pilulas xvij: duæ bis terve indies sumendæ.

¹ Brande, Dictionary of the Materia Medica, p. 248. Lond. 1839.

Electuarium Ferri Sesquioxidi.

Electuary of Sesquioxide of Iron.

℞. Ferri sesquioxyd.

Confect. aurant. aa. ℥j.

Syrupi zingib. q. s.

ut fiat electuarium cujus sumatur cochleare minimum bis vel ter die.

IV. FERRUM CARBURETUM.

SYNONYMES.—Ferri Carburetum, F. Carbonatum, F. Supercarburetum; Graphites, Plumbago, Carbo mineralis. Black Lead, Carburet of Iron.

French.—Carbure de Fer, Graphite, Crayon noir, Plombagine.

German.—Kohlenstoffeisen, Graphit, Reissblei.

This well known substance was formerly considered to be slightly astringent and desiccative. By Weinhold,¹ it has been advised strongly in certain cutaneous affections, but although it has been received into various pharmacopœias of continental Europe, as the Antwerp, Bavarian, Brunswick, Spanish, Parisian, Finnish, Prussian, Saxon, and Swedish, it has never been recognised as a therapeutical agent in this country or in Great Britain.

MODE OF PREPARING.

As crude graphite is frequently very impure from the attached matrix, the Prussian Pharmacopœia has a formula for its purification, the product of which bears the name *graphites depuratus*. With this view, the graphite must be very finely pulverised; a pound of it is boiled in a proper quantity of common water, for an hour, the water is then decanted, and two ounces of nitric acid and of muriatic acid, and eight ounces of common water are poured upon the graphite. This mixture is digested for twenty-four hours, frequently shaking it; the acid fluid is then poured off, and, after the residuum has been washed by an appropriate quantity of common water, it is dried.

EFFECTS ON THE ECONOMY.

The internal use of graphite produces no perceptible change on the organic functions, except that according to Weinhold, under

¹ Der Graphit als ein neu entdecktes Mittel gegen Flechten. Leipz. 1809.

its protracted use, the urinary secretion is augmented, and a disposition to micturition excited. He found, however, that in herpetic and other cutaneous affections, it occasioned a very favourable modification in the eruption, and wholly removed it. In consequence of the results of his observations, he published a monograph in which he recommended the graphite to physicians in those affections. He employed it as well internally as externally. The urine, he asserts, after its administration, commonly began to make a deposit, and this continued until some change in the cutaneous affection announced its approaching cure.

In cases of complication of herpes with other affections, Weinhold combined it with other remedies; in syphilitic eruptions adding corrosive sublimate, &c.

The efficacy of the graphite in herpetic and other cutaneous affections, has also been attested by many other respectable physicians, as Horn, Heim, Ruggieri, Brera, Bernstein, Hildenbrand, Richter, Hufeland, Marc,¹ &c. This gave occasion to its admission into the Prussian Pharmacopœia, yet it has not the confidence of physicians, even in those countries into the pharmacopœias of which it has been received, and is consequently but little used.

Its use in chronic cutaneous diseases is said to have been suggested by the circumstance, that, in Venice, the makers of crayons are speedily cured of any such affections under which they may labour.²

METHOD OF ADMINISTERING.

Internally, graphite is given in doses of from five to fifteen grains, from two to four times daily; and the dose may be augmented, according to circumstances, to a dram in the day. It is given in powder, or in the pilular form. Externally, it is applied in the form of ointment or plaster—from ʒij to ʒvj of the graphite to an ounce of the constituent.

¹ Riecke, *Die neuern Arzneimittel*, u. s. w. Stuttgart, 1837, S. 214; see, also, Weinhold, in *Hufeland's Journal*, B. xxxiv. St. 1. S. 118; Heim, in *Horn's Archiv*. 1810, xii. 326, and *Ibid.* 1811, B. 1. S. 91; Huber, in *Med. Chir. Zeitung*, 1811, No. 68, S. 282; Hufeland, *Journ. der prakt. Heilkunde*, B. xxxviii. St. 6; Bernstein, *Ibid.* B. xli. St. 5; Mayer, *Ibid.* B. lx. St. 2, and Osann, in *Encyclop. Wörterb. der Med. Wissensch.* x. 434. Berlin, 1834.

² Mérat & De Lens, in *Dict. de Mat. Méd. Art. Carbone*.

Pulvis Ferri Carbureti.

Powder of Carburet of Iron.

- ℞. Ferri carburet. pur.
Sacch. alb. aa. ʒss. M.

Divide in partes æqual. vi.

Dose.—One every two hours—in lichen leproides.

HILDENBRAND.

Electuarium Ferri Carbureti.

Electuary of Carburet of Iron.

- ℞. Ferri carburet. pur. ʒss.
Mellis despumat. ʒij. M.

Fiat electuarium.

Dose.—A coffee-spoonful morning and evening. WEINHOLD.

Pilulæ Ferri Carbureti.

Pills of Carburet of Iron.

- ℞. Ferri carburet. pur.
Extract. dulcamar. aa. ʒj.

M. fiant pilulæ, pond. gr. ij.

Dose.—Six, three times a day.

MAERKER.

- ℞. Ferri carburet. ʒij.
Flor. zinci. ʒss.
Axung. porcin. ʒj. M.

MAYER.

Unguentum Ferri Carbureti.

Ointment of Carburet of Iron.

- ℞. Ferri carburet. pur.
Sulphur. depurat. aa. ʒij.
Axung. porcin. q. s. ut fiat unguentum.

BRERA.

Emplastrum Ferri Carbureti.

Plaster of Carburet of Iron.

- ℞. Ferri carburet. depur. ʒij.
Emplast. sapon. ʒiv.

Misce intimè.

WEINHOLD.

V. FERRUM CYANURETUM.

SYNONYMES.—Ferri Cyanuretum, F. Cyanogenatum, F. Oxydulatum Hydrocyanicum, F. Borussias, Ferro Sesquicyanidum, F. Percyanidum, Ferrocyanas Oxydi Ferri, Ferri Ferrocyanas, Ferrum Zooticum, F. Borussicum, Cœruleum Borussicum, C. Beroliniense, Prussiate of Iron, Cyanuret of Iron; Prussian Blue.

French.—Trito-hydro-ferro-cyanate de Fer; Deutoxicyanure de Fer Hydraté; Tritohydrocyanate Ferruré de Fer, Prussiate de Potasse et de Fer, Bleu de Prusse.

German.—Cyaneisen, Blaustoffeisen, Blausaures Eisenoxydul, Eisenblausaures Eisenoxyd, Eisencyanürcyanid, Berliner Blau, Pariser Blau.

In commerce, this preparation with us bears the name "Prussian blue," but in Germany it is called "Pariser Blau." It is not in a state of purity, and, consequently, that which the apothecary prepares is best adapted for internal use.

MODE OF PREPARING.

The form given by Buchner is as good as any. The ferrocyanate of potassa, as commonly met with in commerce, is dissolved in warm distilled water, and to the clear filtered solution is gradually added, in a glass vessel, a solution of chemically pure sulphate of iron so long as a precipitate is thrown down. After the precipitate has fallen to the bottom of the vessel, and the supernatant fluid, which contains sulphate of potassa, has been poured off, the precipitate is first digested with dilute sulphuric or muriatic acid, in order to dissolve the excess of oxide of iron; the beautiful dark blue precipitate is then collected on a filter, carefully washed with boiling water, and dried.

The cyanuret of iron is of a beautiful deep blue colour, and devoid of odour and taste. It is decomposed by heat, and is insoluble in water, alcohol, ether, oils and dilute acids. Potassa and soda decompose it. According to Zollickoffer it adheres firmly to the tongue, which Riecke thinks, though erroneously, is owing to its containing argil.

EFFECTS ON THE ECONOMY.

Of the effects of the cyanuret of iron on the human economy in health we have no evidence. Coullon gave it to various animals, but observed no action from it. It has been given, and not without

success, in several diseases; and Dr. L. W. Sachs, who has not unfrequently administered it, considers it one of the most important chalybeates with which we are acquainted. He thinks it probable, that the hydrocyanic acid has not much agency; yet it certainly seems to differ from all the other preparations of iron.

It has been especially recommended in epilepsy by Kirckhoff¹ of Ghent. In very obstinate cases, not dependent upon organic mischief, he succeeded entirely with it; with the adult he commenced with half a grain daily, and raised the dose gradually to three four, and even six grains and upwards. When the patient was plethoric, he premised bloodletting, or applied leeches, from time to time, to the temples. Hildenbrand and Gergères confirm its efficacy in epilepsy.

In intermittent fever Zollickoffer² found the cyanuret of iron so efficacious, that he even gave it the preference over the cinchona; and his experience has been confirmed by that of Eberle,³ Hosack⁴ and others. Wutzer, in Germany, also exhibited it successfully; and Stosch gave it advantageously, in combination with cinchona and rhubarb, in a case of obstinate intermittent. Sachs likewise tried it frequently, but as often without as with success. When it has proved efficacious in intermittents the dose has been by no means large. Some have given six or eight grains every four hours during the apyrexia, and even as much as a scruple has been administered. Sachs found it several times efficacious when four doses of two grains each were taken. Riecke⁵ affirms that his father obtained essential service from it in the leucophlegmatic conditions resulting from intermittent fever.

Zollickoffer extols the cyanuret also in remittent fever, and there may doubtless be periods when it may be administered with benefit, but it is not often used. He recommends it also in dysentery,⁶ when the inflammatory condition has passed away, either spontaneously or under the efforts of art; and Sachs remarks, that in those atonic conditions of the intestinal canal, which supervene on dysentery, it may doubtless be of great service. Gergères administered it successfully in chronic diarrhœa. L. W. Sachs enters into a long

¹ Journal de Chimie Médicale, iii. 285.

² American Medical Recorder, v. 540.

³ Materia Medica, 2d edit. i. 233.

⁴ New York Medical and Physical Journal, 1823.

⁵ Op. cit. S. 217.

⁶ Chapman's Philadelphia Journal, Aug. 1823.

theoretical disquisition on the precise action of the remedy, in which there is doubtless much that is speculative. He used it, he says, with success, in many cases which it would be difficult to classify under any formal nosology; their common bond, however, was, that they were dependent upon "nervous disorders, especially of the plastic functions of the abdominal organs, the mischief appearing first of all to be gastric." In such affections, he found a combination of the cyanuret of iron with rhubarb especially serviceable. He gave it in not less than two grains for a dose, which he gradually augmented to six grains three times a day. Dr. Moll saw decidedly good effects from its use in a case of immoderate menstruation from atony of the uterus with general elevation of the nervous excitability, after he had employed the remedies commonly recommended unsuccessfully. He found it also extremely beneficial to children of a strumous habit, and great torpor.

Stosch found it serviceable in a case of scrofula, in which hæmatisation was imperfectly accomplished, and Dr. Bridges¹ found great advantage from it in a case of severe and protracted facial neuralgia.

Externally, the cyanuret of iron has been used in the form of ointment, in cases of ill conditioned, torpid and foul ulcers, and even of *noli me tangere*. Stosch applied it in a case of fungous ulcer with marked advantage; forming it into a paste with water and applying it in that form.

MODE OF ADMINISTERING.

Pulvis Ferri Cyanureti.

Powder of Cyanide of Iron.

℞. Ferri cyanuret. gr. iij ad xxxvj.
Sacchar. alb. ʒij. M. et divide in pulveres vj.

Dose.—A powder two or three times a day, in epilepsy.

KIRCKHOFF.

℞. Ferri cyanuret. gr. j, iv, vj ad xij.
Sacch. alb. ʒj.

Fiat pulvis, in partes xij æquales dividendus.

Dose.—A powder every two hours, in epilepsy.

HILDENBRAND.

¹ Wood & Bache's Dispensatory, Art. Ferri Ferrocyanas.

℞. Ferri cyanuret.

Pulv. guaiac. aa. ʒj.

Misce et divide in chartulas xij.

Dose.—One three times a day.—Employed successfully in intermittents.¹

Pilulæ Ferri Cyanureti.

Pills of Cyanide of Iron.

℞. Gum. ammon.

Rad. rhei,

Ext. taraxac. aa. ʒj.

Ferri cyanuret. gr. xvij ad xxxvj.

M. et fiat massa in pilulas lx dividenda.

Dose.—Four to six, twice a day, in disorder of the ganglionic system.

RADIUS, according to L. W. SACHS.

Unguentum Ferri Cyanureti.

Ointment of Cyanide of Iron.

℞. Ferri cyanuret. ʒj.

Unguent. cetacei, ʒj. M. et fiat unguentum.

Applied to foul ulcers.

VI. FERRUM IODATUM.

SYNONYMES.—Ferri Iodidum, Ferri Ioduretum, Iodated Iron, Iodide of Iron, Ioduret of Iron, Protoiodure or Protoiodide of Iron.

French.—Iodure de Fer, Protoiodure de Fer.

German.—Iodeisen.

AND

FERRUM HYDRIODATUM.

SYNONYMES.—Ferri Hydriodas, Ferrum Hydroiodicum Oxydulatum, Hydriodated Iron, Hydriodate of Iron, Hydriodate of Protoxide of Iron.

French.—Hydriodate de Fer.

German.—Hydriodsaures Eisenoxydul.

Although attention had been directed, several years ago, to this preparation, it was not much used, until Prof. A. T. Thomson,² of

¹ Ellis's Formulary, 5th edit. p. 161. Philad. 1838.

² Some observations on the preparation and medicinal employment of the Ioduret and Hydriodate of Iron, 8vo. pp. 64. Lond. 1834.

the London University, recommended it strongly in a special monograph a few years since. It has been lately received into the London Pharmacopœia.

MODE OF PREPARING.

The following method is recommended by Dr. Thomson. One part of iron wire should be rubbed in a porcelain or wedgwood mortar, with about three or four parts of iodine, gradually adding distilled water, until fifteen parts of the fluid have been used: the whole is then to be introduced into a Florence flask, with an additional portion of wire and of distilled water. This excess of iron is a matter of indifference in the preparation of the hydriodate, and in that of the iodide it is necessary for preserving the combination from decomposition during the evaporation of the solution. These materials are next to be boiled together, until the fluid acquires a pale greenish colour, when it must be filtered. This solution contains a hydriodate of the protoxide of iron; and, if the exact quantity of the iodine be previously ascertained, so as to enable us to procure the solution of a definite strength, it may be kept in this state for medicinal use. In general, however, the solution is evaporated to dryness, and for this purpose it may be poured into a clean flask, containing a piece of iron wire sufficiently long to reach from the bottom to the surface of the fluid, and the boiling should be continued until the bulk of the solution be reduced to one third. It must then be filtered, after which the evaporation should be continued to dryness. It is necessary to break the flask as soon as the mass is cold, in order to obtain the solid iodide, which should be immediately transferred to a dry bottle, accurately fitted with a ground stopper. The bottle should not hold more than two ounces of the preparation; for when it is large and not full, the iodide deliquesces nearly as rapidly as when it is exposed to the free action of the atmosphere. When the flask is broken, and the iodide bottled before the mass is cold, deliquescence also takes place, a peroxide of the metal is formed, and iodine is evolved.

The plan proposed by Mr. Durand,¹ of Philadelphia, after that by MM. Baup and Caillot,² for preparing the solution of the protoxide of iron (hydriodate of protoxide of iron) is the following:—

Take of iodine 3x, iron filings, perfectly pure and unoxidised,

¹ Philad. Journ. of Pharmacy, iv. 287. Philad. 1833.

² Ibid, i. 201.

3v, distilled water 3xiiss. Put the iodine into a porcelain capsule, with one half the quantity of water, add the iron filings by small portions, stirring the mixture with a glass rod. The combination soon takes place; heat is evolved with the disengagement of a small quantity of vapour of iodine, and the mixture acquires an orange colour, which gradually deepens to a dark red. When the whole of the iron has been added, the capsule is put in a sand bath or over the flame of a spirit lamp and heated slowly; continuing to stir the liquid. An iodureted hydriodate of iron is first produced, which, under the action of heat, soon passes to the state of a simple hydriodate. This point is indicated by the entire discoloration of the solution. In this state it is filtered; and the dregs and filter are carefully washed with the remaining half of the distilled water, previously heated to the boiling point. In this manner, a solution forming twelve and a half fluid ounces is afforded, one ounce of which represents one dram of iodide of iron.

The solution, which is at first colourless, acquires a deep red colour by standing, and precipitates some oxide of iron; by which it is reduced to the state of an iodureted hydriodate of iron; but it may be easily restored to its former state by heating it again with a small quantity of iron filings, until the liquid becomes colourless.

The iodide of iron is obtained by evaporating to dryness the filtered solution, taking care, towards the end, to stir incessantly with an iron spatula, and to detach the salt from the bottom of the capsule as it forms. The heat must be managed most carefully, diminishing it gradually, and removing the capsule quickly from the fire as soon as the odour of iodine is evolved. The solution of this salt, when the iodide is well prepared, is of a light orange colour, and deeper in proportion to the decomposition which some parts may have undergone towards the end of the operation.

The iodide requires to be well secured from the influence of the atmosphere, both on account of its deliquescent property, the rapid oxidation which the metal undergoes when deliquescence occurs, and the consequent decomposition which takes place. It is important to prevent this, as the peroxide of iron is inert as a medicinal agent; whilst the free iodine extricated during its operation, according to Dr. Thomson, alters altogether the virtues of the medicine. This partial decomposition of the iodide is rendered immediately apparent on dissolving it in twenty times its weight of distilled water, and filtering: instead of a permanent, clear, very pale greenish yellow, we obtain an ochre-coloured, completely insoluble precipitate. Much of the iodide, usually prepared, is of

this description, and to this may, doubtless, be referred some of the disappointment and discrepancy amongst practitioners as to the operation of the medicine in cases apparently similar. Even when the iodide has been carefully prepared, it often contains a little free iodine; but, according to Thomson, it is chiefly owing to the carelessness of assistants and apprentices in compounding prescriptions, by frequently exposing the iodide to the air, that its properties, and, consequently, its medicinal powers, are impaired: hence, it is preferable to keep it in solution, or in the form of hydriodate, which it becomes, whenever water is added to it.

If the solution be prepared with a definite quantity of iodine, as described, it will keep without changing its characters; but as it is usually made, by dissolving the iodide in distilled water, it requires to be rendered neutral by the following means:—Introduce into a flask the solution of any given strength, and place in it two or three doubles of clean and soft iron wire, sufficiently long to extend to the surface of the fluid; boil for a few minutes, and then leave it at rest, until the solution becomes clear, after which it may be either decanted off from the precipitate which forms, or filtered: no farther change takes place in a solution thus treated, provided it be kept in a blackened or a green bottle, however long it may be preserved. In this process, the wire affords iron to saturate any free iodine present in the solution, or that may have been extricated by the formation of the peroxide of iron in the iodide; and a perfectly neutral solution being thus obtained, by the immediate conversion of the newly formed iodide into the hydriodate of the protoxide, no subsequent change takes place so long as the solution is kept secluded from the light. The best proportions, according to Dr. Thomson, for forming the medicinal solution, are three grains of the dry solid iodide to each fluidram of distilled water. If the water be not either distilled or filtered rain water, perfectly free from foreign ingredients, and particularly if it contain any earthy or saline carbonates, decomposition instantly takes place, iodine is extricated, and a carbonate of iron, which rapidly passes into the state of a peroxide of that metal, is precipitated.

When iodide of iron is carefully prepared, it is of an iron gray colour, foliated texture, brittle, and exhibits a crystalline arrangement similar to metallic antimony, except that it is darker. In the dry state, it is inodorous; but, when moist, it smells somewhat of iodine: the taste, when dry, is simply styptic; when moist, somewhat acrid, before it impresses the gustatory organs. At 350° of Fahrenheit it fuses; and, at a higher temperature, is decom-

posed,—the iodine being volatilised, and the iron remaining in the state of oxide. It dissolves in all proportions in water,—the changes supervening, which have been already indicated. It is decomposed by chlorine, the mineral acids, oxide of arsenic, meconic acid—consequently by opium and laudanum—gallic acid, and tannin, the pure and carbonated alkalies, different metallic salts, and by the infusions of digitalis, belladonna, hyoscyamus, tobacco, amylaceous substances, &c.: such substances ought not, therefore, to be given in combination with it.

EFFECTS ON THE ECONOMY IN HEALTH.

From experiments made on his own person, Dr. Thomson states the following to be the physiological effects of the hydriodate of iron.

When taken in doses of from three to five grains, it makes no sensible impression on the stomach, although it sharpens the appetite, and improves the digestive function: it seems to stimulate moderately the digestive canal through its entire length; for it opens the bowels; and, whilst it produces the black colour of the alvine discharges characteristic of all the preparations of iron, it corrects their fœtor. When it does not affect the bowels, it augments the action of the kidneys, increasing the flow of urine; and if the solution be taken two or three times a day, for several days successively, the presence of both the iodine and the iron can be readily detected in the urine. The temperature of the skin is moderately elevated, and the insensible perspiration increased. On one occasion, having taken ten grains for a dose, it almost immediately caused an uneasy sensation at the epigastrium, accompanied with nausea that continued for several hours, and a slight degree of headach. These symptoms were relieved by a copious evacuation, which was perfectly black. Two hours after taking the medicine, a large quantity of urine was discharged; which, on being tested, displayed the presence of both the iodine and the iron.

The experiments on animals, made by Dr. Cogswell,¹ induced him to infer:—

1. That the iodide of iron acts as a local stimulant, possessing the power of effecting peculiar disorganisation.
2. That its action is more particularly directed to the tract of the alimentary canal.

¹ Essay on Iodine, p. 132. Edinb. 1837.

When added to blood out of the body, the iodide of iron promotes its coagulation.¹

EFFECTS ON THE ECONOMY IN DISEASE.

From the chemical composition of the iodide of iron, Dr. Thomson considered it might be specially adapted for cases in which augmented activity of the capillary, or intermediate system, with a tonic effect, might be indicated, and particularly in scrofulous affections, tabes mesenterica, chlorosis, incipient scirrhus, rickets, amenorrhœa, bronchocele, atonic dyspepsia,—indeed, in all cases accompanied by debility. In such affections, he conceives the iodide will act more efficiently than any of the other preparations of iron. In secondary syphilis, it may be combined, he suggests, with iodide of potassium; and in incipient cancer, its efficacy, is aided by the administration of arsenic at the same time. Dr. Thomson has found it serviceable in atonic gastric dyspepsia, when combined with bicarbonate of potassa, and taken at the moment of admixture, in the dose of from three to eight grains or more.² A great advantage it possesses is its ready solubility, owing to which it can enter the circulatory system with facility, and modify the condition of the fluids. In chronic scrofulous cases, it produces all the good effects of the preparations of iron, without any of the concomitant and subsequent symptoms that are so apt to supervene, especially in impressible individuals. Where the case is accompanied by vascular erethism, or fulness, they must be reduced before the iodide can be esteemed appropriate. In chlorosis, occurring in strumous habits, it has been found most serviceable. Its efficacy in cancer is elucidated by Dr. Thomson, by the details of a case of scirrhus mamma, which, after protracted and fruitless treatment by other agents—as by other preparations of iron combined with conium—ultimately yielded to a combination of the hydriodate of iron and conium.

Some cases are also detailed in which the hydriodate of iron was very effective in removing old syphilitic affections, especially of the skin.

Prior to the publication of Thomson, Pierquin had given the

¹ Magendie, *Leçons sur le Sang*, &c.; and translation in the *Lancet*, Jan. 26, 1839.

² London Dispensatory, and Brande's *Dictionary of Mat. Med.* p. 252. Lond. 1839.

iodide in cases of leucorrhœa and amenorrhœa, and Eager¹ had recommended it in scrofula. Ricord² found the very best effects from its internal use in cases where tonics required to be combined with antisiphilitic remedies, especially where any scrofulous vice (lymphatisme) constituted a complication. He administered it likewise with great success, to remove the consequences of syphilis, and found it advantageous in atonic ulcers of the legs and in spreading ulcers of the throat, which had been aggravated or had not yielded to mercury. The strength of M. Ricord's solution was half a dram of the iodide to ℥viij of water, given, we presume, in the twenty-four hours.

M. Ricord³ also uses it in the form of injection in cases of blennorrhœa. Wherever, indeed, tonic astringent injections are needed, the iodide, in his opinion, should occupy the first rank. Its use, he thinks, can only be contra-indicated when there is much inflammation or pain in passing the urine, or when cystitis exists. The strength of the injection should be three grains to the ounce of water.

In consequence of its promoting the coagulation of the blood out of the body, Magendie⁴ prescribed it recently in the form of injection (℥i to ℥ij of water) employed several times a day in a case of severe uterine hemorrhage. The hemorrhage ceased.

We have frequently given this remedy in public and private practice, and have considered it especially adapted for those cases in which there appears to be torpor in the system of nutrition, as in cases of asthenic dropsy, old visceral engorgements, and indeed of hypertrophy of any kind, accompanied by deficient action in the intermediate system of vessels. In oligæmia, where there is paucity of red globules in the blood, and the fluid is altogether too thin, it would seem to be especially indicated, from its property, mentioned above, of promoting the coagulating of the blood, and therefore, of inspissating it. Hence in all cases of scorbutic, hydropic and other dyscrasies, and in hemorrhages occurring in such pathological conditions of the system, we have prescribed it largely and with the very best effects. It appears to us, indeed, to be

¹ Dublin Journal of Medical Science, 1834; also, Cogswell on Iodine, p. 138, Edinb. 1837.

² J. J. L. Rattier, in *La Lancette Française*, Fév. 4, 1837.

³ J. J. L. Rattier, *Ibid.* Fév. 16, 1837; see, also, *Revue Médicale*, Janvier, 1838, and *American Med. Intelligencer*, Sep. 15, 1838, p. 195.

⁴ *Op. cit.*

the best remedy we possess wherever a sorbeficient and tonic are indicated.

MODE OF ADMINISTERING.

The dose of the iodide of iron, administered in the cases above referred to, was generally three or four grains two or three times a day.

Liquor Ferri Iodidi.

Solution of Iodide of Iron.

℞. Ferri iodidi, gr. xxiv.
Aquæ destillat. ℥j. M.

Dose.—An ordinary tea-spoonful contains about three grains.

A. T. THOMSON.

The following formulæ are recommended by Pierquin :¹

Vinum Ferri Iodidi.

Wine of Iodide of Iron.

℞. Vin. Bordegalens. ℥j.
Ferri iodidi, ℥ss. M.

Dose.—A tea-spoonful morning and evening.

Tinctura Ferri Iodidi.

Tincture of Iodide of Iron.

℞. Ferri iodidi, ℥ij.
Alcoholis,
Aquæ, aa. ℥ij. M.

Dose.—A tea-spoonful morning and evening.

Trochisci Ferri Iodidi.

Lozenges of Iodide of Iron.

℞. Ferri iodidi, ℥j. (℥ss.)
Croc pulv. ℥ss. (℥ij.)
Sacchar. alb. ℥viiij. (℥iv.)

M. fiant Trochisci No. 240, (120.)

Dose.—Six to ten daily.

¹ Journal de Chimie Médicale, p. 310, Mai, 1831.

Solutio Ferri Iodidi. (French, *Eau d'Hydriodate de Fer.*)

Solution of Iodide of Iron.

℞. Ferri iodidi, ℥ss.
Aquæ, ℥ij. M.

Added to enemata, lotions, and injections.

℞. Ferri iodidi, ℥ss ad ℥ij.
Aquæ destillat. ℥j. M.

To be added to a general bath in cases of leucorrhœa, amenorrhœa, &c. PIERQUIN.

Unguentum Ferri Iodidi.

Ointment of Iodide of Iron.

℞. Ferri iodidi, ℥iss.
Adipis suillæ, ℥j. M. ut fiat unguentum.

A piece of the size of a hazelnut to be rubbed, morning and evening, on the inner part of the thigh, in cases of leucorrhœa and amenorrhœa.

VII. FERRUM NITRATUM.

SYNONYMES.—Ferri Nitras, Nitrate of Iron.

LIQUOR FERRI PERSESQUINITRATIS.

SYNONYMES.—Liquor seu Solutio Nitratis Ferri, Liquor Ferri Nitrici Oxydati, Solution of Persesquinitrate of Iron, Solution of Nitrate of Iron.

MODE OF PREPARING.

This preparation, which has been introduced within the last few years into practice, may be formed in the following manner.

Take of small chips or pieces of iron wire, an ounce and a half; nitric acid, three ounces by measure; water twenty-seven ounces; muriatic acid, one dram. Put the iron into an earthenware vessel, and pour on the nitric acid, previously diluted with fifteen ounces of the water. Set the vessel aside till the whole of the acid has united with the iron, so as to form a persesquinitrate, then decant the liquid from the portion of iron, which remains undissolved; strain and filter. Add the muriatic acid with the remainder of the

water, or with as much of that liquid as will increase the whole solution to thirty ounces.

When the process is finished—which takes some hours—the liquid has a red colour, so dark, that when viewed by reflected light, it seems almost black.

Three ounces of nitric acid of the usual strength (1.4) generally dissolve an ounce of iron, so that when the process is completed, a portion of the metal remains undissolved. The solution then consists entirely of the persesquinitrate of iron; and, if speedily decanted, it may be preserved in that state, but if allowed to stand for a few hours longer on the iron, it will undergo a further change, becoming gradually converted into pernitrate and protonitrate of iron. The first of these is insoluble, and renders the liquid turbid; and the latter, which remains dissolved, has not the medical properties that render the persesquinitrate valuable. When the solution contains nothing but nitric acid and peroxide of iron, it slowly undergoes decomposition on standing, so that, at the end of a few weeks, the whole liquid begins to become turbid. The addition of some muriatic acid prevents this decomposition, and the quantity sufficient for this purpose is too small to affect the medicinal powers of the persesquinitrate. The solution, when properly prepared, is of a beautiful dark red colour, when viewed with transmitted light. Its taste is very astringent, and not at all caustic.¹

EFFECTS ON THE ECONOMY IN HEALTH.

This preparation greatly resembles the solution of the muriate of iron in its medicinal properties. Mr. Kerr considers, that to an astringent power, it unites the property of diminishing the irritability and tenderness of the mucous membranes with which it comes in contact.

Kopp administered it with the greatest success in many cases of chronic diarrhœa that had resisted every approved remedy. The fæces were blackened by it, as by the preparations of iron in general. He remarks, however, that it must be continued for some time. The dose he gave was ten drops several times a day in oatmeal gruel, and this was gradually raised to twenty and twenty-

¹ Mr. Kerr, in *American Journal of the Medical Sciences*, for May, 1832, cited from *Edinb. Med. and Surgical Journal*.

five drops. When the cure was accomplished, the remedy was gradually diminished, until it was left off altogether.

Dr. Graves¹ speaks in equally high terms of the persesquinitrate in these cases; and very recently Dr. T. C. Adam of Lenawee county, Michigan, has recorded the remarkable assistance, which he has derived from its use in the treatment of several diseases, especially diarrhœa, and other affections of the mucous membranes accompanied by discharges.² In chronic diarrhœa depending mainly on an excess in the sensibility of the organic nerves which supply the digestive tube, Dr. Adam rarely orders less than fifteen drops at the commencement, and after a few days' employment of the remedy, he increases the quantity to twenty, twenty-five and thirty drops.

In leucorrhœa occurring in such as are pale, exanguious, feeble and languid, the internal, conjoined with the external, use of the persesquinitrate has been found very advantageous. In these cases, Dr. Adam adds such a quantity of water as a diluent as will still leave in the vagina a gentle degree of heat or smarting.

Dr. Adam recommends it also in cases of aphthous sores; and he affirms that its application has afforded relief in toothach.

It is doubtless a powerful astringent, but it is questionable whether it possess any advantage over the solution of the muriate of iron.

VIII. FERRUM OXYDATUM HYDRATUM.

SYNONYMES.—Hydras Ferricus, Hydro-oxide of Iron, Hydroxide of Iron, Hydrated Oxide of Iron, Hydrated Peroxide of Iron, Hydrated Tritoxide of Iron.

German.—Eisenoxydhydrat.

The hydrated oxide of iron has been recently introduced into practice as an antidote to white arsenic. Dr. Bunsen, of Goettingen, had already made frequent experiments with it, which satisfied him that it was an efficacious agent, when, along with Dr. Berthold,³ he subjected it to fresh trials. The results of their investigations were published, and since then it has received due attention every where.

¹ Clinical Lectures, Amer. Med. Library Edition, p. 128. Philad. 1838.

² American Journal of the Medical Sciences, May, 1839, p. 61.

³ Das Eisenoxydhydrat, ein Gegengift der arsenigen Säure. Götting. 1834.

METHOD OF PREPARING.

The best mode of preparing it, according to Dr. Bunsen, is to take a solution of pure sulphate of iron, increase its dose of oxygen by treating it with nitric acid, and precipitate the oxide by adding pure ammonia in excess, washing the precipitate. In order not to deprive the precipitate of its water, and to diminish its loose state of aggregation as little as possible, it is not filtered, but is put aside for a few days, until the precipitate is wholly deposited, after which the supernatant fluid is poured off. It is then kept in well-stopped vessels.

Riecke¹ has added the formula for pharmaciens, which is recommended by Von Spécz.

℞. *Vitrioli ferri puri crystallizati* libram; teratur in pulv. subtiliss. et detur in vas. porcellan. aut murrhinum, impositum balneo arenæ, dein adde *acidi nitrici concentrati* ℥ss; terantur ope baculi vitrei usque dum massa resolvitur in pulvem; nunc, igne animato, massæ pultaceæ calidæ affunde sensim terendo, sensim *acid. nitric. concentrat.* q. s. donec nullum amplius evolvatur gas nitrosum. Massa tunc leni igne evaporetur ad siccitatem et solvatur demum in aq. destill. q. s.; solutioni filtratæ instilletur *ammonia puræ* q. s. donec precipitatio cesset; stent nunc per horam unam alteramve et liquor limpidus a sedimento bruneo decantetur; massæ residuæ fundum petenti adfunde aq. destillat. ℥iij et agitentur; nunc filtra, et præcipitatum in filtro aq. destill. q. s. edulcora donec aqua insipida defluat. Præcipitatum bene edulcoratum in umbra siccatum convertat. in pulv. subtilissim. qui servetur base vitreo bene clauso.²

Lassaigne advises it to be prepared as follows:—Take iron filings; pour gradually upon them four times their weight of the

¹ Die neuern Arzneimittel, S. 227. Stuttgart, 1837.

² "Take of *pure crystallised sulphate of iron* a pound: rub it into a subtle powder, and place it in a porcelain or glass vessel in a sand-bath; then add half a pound of concentrated nitric acid; stir them with a glass rod until the mass is resolved into a soft paste; then—the fire being raised—pour gradually on the hot pultaceous mass *concentrated nitric acid*, until no more nitrous gas is evolved. Let the mass be evaporated by a gentle heat to dryness, and at last be dissolved in a sufficient quantity of distilled water. Into the filtered solution drop *pure ammonia* as long as any precipitate occurs; let it now stand for an hour or two, and then pour off the limpid liquor from the brown sediment. On the residuary mass, remaining at the bottom, pour three pounds of distilled water, and shake them together: filter and wash the precipitate on the filter with distilled water, until the water is tasteless. The well-washed precipitate dried in the shade forms a subtle powder, which may be kept in a well-closed vessel."

nitric acid of commerce in small portions. Heat is thereby developed, and deutoxide of azote, which is transformed by the atmospheric air into nitrous acid vapours. When the evolution of gas has ceased, ten or twelve parts of water are added; the mixture is then filtered, and ammonia added until the mixture begins to exhibit an alkaline reaction. The precipitate, thus formed, is the hydrated oxide of iron, which is collected on the filter, and washed with boiling water until it is tasteless, and ceases to exhibit any alkaline characters.

The mode of preparation, recommended by Majesté, agrees with this, except that he boils one part of iron filings with four of nitric acid and four of muriatic acid.

EFFECTS ON THE ECONOMY.

If a solution of arsenious acid be decomposed by fresh precipitated oxyhydrate of iron suspended in water, traces of arsenic can no longer be detected in the filtered liquid, made acid and tested by a stream of sulphuretted hydrogen gas. To throw down one part of arsenic, in this manner, requires a quantity of the oxyhydrate, which contains at least ten or twelve parts of oxide of iron. Yet, even where a smaller quantity is employed, the arsenious acid is almost wholly separated, as a stream of sulphuretted hydrogen gas affords only very slight traces of sulphuret of arsenic in the filtered and acidulated liquid. When the substances are previously heated, or the arsenious acid is exposed in small portions to the precipitating agent, the reaction is still slighter. If a few drops of ammonia be added to water in which the oxyhydrate of iron is suspended, and the mixture be digested with finely powdered arsenious acid, an insoluble arsenite of iron is formed; a circumstance, which would encourage the belief—even had it not been sanctioned by experience—that freshly prepared oxyhydrate of iron may serve as an antidote to arsenic: the union between it and arsenious acid forming—as we have seen—an insoluble compound, devoid of all poisonous influence on the economy, and only exciting gastric oppression, when given in large doses.

Accurate microscopical investigation in experiments on animals that had taken arsenious acid in the solid form mixed with the oxyhydrate, exhibited to the discoverer of the antidote, that, under the influence of the animal heat and the peristaltic motion, it had become completely converted into the arsenite of iron, and thus rendered innocuous. Such was the result of the observations

of Boulet,¹ Orfila, Chevalier, Lassaigne, Soubeiran & Miquel,² Nonat, Borelli & Demaria,³ Lesueur, Boulay fils,⁴ Monod⁵, and Von Spécs. On the other hand, the experiments of Brett,⁶ Reginald Orton,⁷ and Cramer, were unfavourable; but Messrs. Bunsen and Berthold remark, that the experiments of those gentlemen could not be expected to be successful, as they were made with doses of arsenic of from two to nine grains; and the stomach of the rabbit cannot retain more than from one ninth to one half the quantity of the antidote prepared according to their formula, which is necessary to neutralise that quantity of the poison.

Messrs. Bunsen and Berthold, from the results they have obtained, recommend the oxyhydrate as the chief antidote in all cases of poisoning by arsenic; and they advise emetics to be associated with it—along with the agents hitherto employed—first, when the quantity of the poison taken has been considerable, and, therefore, a very large quantity of the antidote is demanded; secondly, when, at the same time, substances containing tannin, as infusion of green tea, or sulphuretted hydrogen, developed after the eating of eggs, may be suspected in the alimentary canal,—as these substances are closely related to the antidote, and may weaken its action; and, thirdly, when, prior to taking the poison, the stomach has been overloaded with food, and is, therefore, capable of receiving only a small quantity of the antidote.

But, whether vomiting may be excited or not, recourse must be had to the oxyhydrate as speedily as possible. Tepid mucilaginous drinks may also be given to envelope the particles of arsenic that may exist in the compartments of the stomach. If the quantity of the poison taken be unknown, the antidote may be administered in a considerable dose, and if the patient should vomit, it may be exhibited afterwards in smaller quantity. But, if no vomiting should arise, it is recommended that he should continue to take the oxyhydrate until the arsenite of iron formed has had time to pass into the intestinal tube; and even after this it may be persevered with in small doses for a time, as portions of arsenic may possibly remain behind unchanged. With the same view, the oxyhydrate

¹ Gazette Médicale de Paris, 1834.

² Bullet. Général de Thérap. Dec. 1834.

³ Br. and For. Med. Rev. April, 1836, p. 594.

⁴ Journal Hebdom. des Progrès des Sciences Médéc. Mars 14, 1835.

⁵ Gazette Médicale, Aug. 22, 1835, and Annales d'Hygiène, &c. xiv. 134.

⁶ Lond. Med. Gaz. xv. 220.

⁷ Lancet, Nov. 8, 1834.

may be thrown up in the way of clyster, whenever it is presumable that the compound formed by the oxyhydrate and the arsenic has reached the lower portion of the bowels. To aid this, cathartics may be administered. Of these, castor oil, which would first suggest itself, might interfere, it has been conceived, with the operation of the antidote. The sulphate of magnesia, or any of the neutral salts, should have the preference.

The antidote may be given suspended in water. Experience has shown Messrs. Bunsen and Berthold, that from ten to twenty parts of the hydrated oxide of iron are more than sufficient to convert one part of arsenious acid into the basic salt of iron.

As the quantity of arsenic in the stomach and intestines can scarcely ever be appreciated, it is considered by them advisable to allow the patient to take as large doses of the oxyhydrate as the stomach can tolerate; and it is of essential importance that it should be taken as hot as it can be borne. When the arsenious acid has been swallowed in the undissolved state—in the form of powder, or in larger or smaller pieces—it is necessary, in order to aid its solution, and to effect a speedy union with the oxide of iron, to add a small quantity of pure ammonia to the antidote, until a slight alkaline reaction is evinced. As the ammonia does not enter into the composition of the salt formed, and, consequently, only plays a secondary part, ten or twenty drops may be sufficient for the purpose.

The various experiments that have been instituted on animals have shown the protective power of the hydrated peroxide; it must be borne in mind, however, in all such experiments made on dogs, that they readily reject the poison by vomiting; but if the poison be retained in the stomach by a ligature passed round the œsophagus, it exerts its accustomed deleterious effects.¹ It would seem, also, that the same result occurs if the dose of the arsenic be too small to induce vomiting. The animal may then die of the poison.²

It would appear, that cases have occurred, in which this antidote has saved the lives of some who might have been destroyed without its agency. Buzorini³ had a case in which about thirty-

¹ MM. Miquel and Soubeiran, *Bullet. Général de Thérapeutique*, Dec. 1834. See on this subject, Dr. Joseph E. Muse, in *Amer. Med. Intelligencer*, for April 2, 1838.

² Dr. Robert B. Hall, in *Amer. Med. Intelligencer*, for Sept. 15, 1838, p. 181.

³ *La Lancette Française*, Nov. 17, 1835.

five grains of arsenic had been swallowed, and where it was successful, although twenty-four hours had elapsed since the poison had been taken; but this cannot be regarded as very satisfactory, inasmuch as the patient might probably have been saved by ordinary means. In another case, which was also treated by the antidote at a late period, marked alleviation of the sufferings was induced. Three cases are, also, related by Majesté, two by Bineau,¹ one by Benoist, and one by Geoffroy,² of Paris, which were treated successfully in the same manner. The subject of the last was a hair-dresser, thirty-five years of age, who, in a paroxysm of delirium tremens, swallowed a dram and a half of arsenic. Half an hour afterwards the antidote was given, suspended in water. He drank, in twelve hours, all the tritoxide produced by the decomposition of five ounces and five drams of the tritosulphate of iron. He had no violent colic; and, twenty-four hours afterwards, experienced scarcely any uneasiness.

A successful case has, also, been related by Mr. John Robson, house surgeon to the Warrington Dispensary.³

Dr. Richard H. Thomas, of Baltimore,⁴ has published a case, in which it was believed that twenty grains of arsenic had been taken, and which was relieved by the hydrated peroxide, administered six hours after the poison was swallowed: there was no vomiting; but thirst, burning pain, and exquisite tenderness at the epigastrium existed, denoting eso-gastritis. Half a fluid ounce of the hydrate, which was in the wet state, and about the consistence of thick cream, was given in a tumbler of cool water, and the dose was directed to be repeated every ten or fifteen minutes in two ounces of water: eight ounces of the suspended hydrate were taken in the twenty-four hours, after which the patient seemed free from disease. "The length of time—six hours"—says Dr. Thomas, "before any very severe symptoms supervened, and before the antidote was administered, at first caused me to think that the patient might have been deceived. Professor Von Spécs, of Vienna, however, asserts, 'that a dram of arsenic, in powder, does not produce its deadly effects on the system in less than six or eight hours, while the same quantity, dissolved in warm water, destroys life in

¹ *Journal des Connaissances Médico-Chirurg.* Nov. 1835.

² *Journal de Méd. et de Chirurg. Pratiq.* Sept. 1835; and *Br. and For. Med. Rev.* April, 1836, p. 572.

³ *Lond. Med. Gazette*, Nov. 5, 1836; also, *Amer. Journ. of the Med. Sciences*, p. 222, May, 1837.

⁴ *American Medical Intelligencer* for July 16, 1838, p. 167.

a much shorter time.' In the present instance, it was swallowed in a dry state, covered with sugar. The prompt relief, which followed the exhibition of the peroxide, is also confirmatory of the impression that the poison was really taken."

More recently, a case has been published by Dr. Deville,¹ which was treated by this remedy, but as the patient vomited much, and the vomited matters were not examined, it is doubtful what was the agency of the oxide. Between five and six hours elapsed before it could be procured.

It has been recommended by Meuser, Riecke, and others, that the hydrated peroxide should be kept in the shops, ready mixed with a definite quantity of water, in order that it may be always at hand, so as to be administered without delay; and the recommendation is good. Even if not to be trusted to alone, the evidence is quite sufficient to show, that it ought to be regarded as an important element in the treatment of every case in which arsenic has been taken.

Instead of the pure hydrated peroxide, Von Spécs² employed substances in which the peroxide is known to exist in considerable quantity, and which require no previous preparation, as rust of iron, and hæmatite, (red iron ore,) and, from his experiments, he is led to conclude, that although these substances do not prevent all the bad effects of arsenic on the system, they may—in the absence of the hydrated peroxide—be employed as antidotes to that poison. The rust of iron has the advantage of being readily procurable.

FILIX MAS.

SYNONYMES. *Aspidium Filix Mas*, *Athyrium Filix Mas*, *Polypodium Filix Mas*, Male Fern.

French. Fougère Mâle.

German. Farrenkraut, Johanniswurz.

The root of the male fern has long been celebrated—since Dioscorides indeed—as an anthelmintic; and especially for the

¹ *Revue Médicale Franç. et Etrangère*, Sept. 1838; see, also, *Br. and For. Med. Rev.*, and *Johnson's Medico-Chirurgical Review* for April, 1839; and *American Journal of the Medical Sciences*, May, 1839, p. 243.

² *Med. Jahrbücher des k. k. ö. St. B.* xix. S. 621. Wien, 1836; and *Ibid.* B. xx. S. 149. Wien, 1836. See, also, *Br. and For. Med. Rev.*, July, 1837, p. 237; and *Amer. Journ. Med. Sciences*, Feb. 1838, p. 519.

destruction of *tænia*.¹ For these properties, it has been introduced into most of the Pharmacopœias. It was the basis of Madame Nouffer's celebrated remedy for *tænia*, which was purchased by Louis XVI. in 1775, for 18,000 francs. We notice it here, on account of the proposition of Peschier,² of Geneva, to administer the ethereal extract, which has since been carried into effect, and apparently with the best results. It appears to possess the advantage of being by no means unpleasant to the taste, and to be accompanied by none of the disagreeable effects, that are associated with the action of most of the other vermifuges.

To prepare the extract, the root is cut small, and digested for ten or twelve days, in the cold, in a sufficient quantity of sulphuric ether,—the tincture is then pressed, concentrated by distillation, and the ether thereby fully removed.

From a pound of the root, about eighteen drams of a brownish green, thick extract are obtained, which possesses the repulsive odour of the plant, and has an acrid taste.

In Germany, the extract is generally prepared according to the formula of the Prussian Pharmacopœia, which is as follows—Take an ounce of the powdered root, and pour thereon eight ounces of the sulphuric ether of commerce; close the vessel, shaking it occasionally, and let it stand until the fluid has acquired a yellowish colour; then separate the fluid as before described; distil off the sulphuric ether until only a third remains, and evaporate the remainder, in a water bath, until a thin brownish yellow coloured extract remains.

This extract contains not only the volatile oil of the fern, but also a fixed oil, tannin, acetic and gallic acids, a muco-saccharine matter, green and red colouring matter, and a semi-resinous substance. By some it is called the *Olenm Filicis Maris*. The active constituents of the fern are highly concentrated in it; and as the result of numerous trials, it was found, that from eighteen to twenty grains, given at night, and the same quantity in the morning fasting destroyed *tæniæ*, so that on the administration of a cathartic, the parasite was discharged—often in the form of a ball. Not unfrequently, indeed, it was voided before the cathartic was given.

In Germany, this new preparation has been chiefly recommended by Hufeland, who maintained, that in rapidity, certainty and gen-

¹ Mérat & De Lens, Dict. de Mat. Méd. Art. Polypodium.

² Nouvelle Bibliothèque Médicale, Sept. 1828, p. 151, and Biblioth. Univer. xxxi. 324, 1826.

teness of action, it exceeds all known means, and many other physicians have testified to the accuracy of this opinion. Radius,¹ who frequently prescribed it, says he never gave it without bringing away large pieces of the worm, but frequently the head remained behind.²

Buchner³ thought, that the extract might be prepared with alcohol, but many physicians have objected to this menstruum,—that it does not dissolve the fixed oil.

MODE OF ADMINISTERING.

The extract is commonly given in the form of pill; emulsion does not answer, because the active constituents are apt to be enveloped and masked in this form. In Geneva, it is now frequently united with castor oil, this renders it unnecessary to give a cathartic after it. For the cathartic when needed, they advise in Bern, infusion of senna with epsom salts, manna, and aniseed.⁴ To children it may be given in syrup.

Mel Filicis Maris.

Honey of the Male Fern.

℞. Ext. æther. filicis maris, ʒss.
Mellis rosat. ʒss. M.

Half of this to be taken on going to bed; the other half early in the morning fasting.

RADIUS.

¹ Auserlesene Heilformeln, u. s. w. Leipz. 1836.

² See, also, Ebers, in Hufeland & Osann's Journal, lxvi. St. 1. S. 43, and Gazette de Santé, Sept. 25, 1828.

³ Repertorium für Pharmacie, xxiii. 433, xxvii. 337, and Funk, in medicin. Zeitung, Mai, 17, 1837, S. 102.

⁴ Hufeland und Osann's Journal, lxiv. St. 1. S. 133.

FUCUS CRISPUS.

SYNONYMES. Lichen Carrageen, Chondrus Crispus, Sphærococcus Crispus, Ulva Crispa, Chondrus Polymorphus, Irish Moss, Carrageen or Corigeen Moss.

French. Mousse d'Irlande, Mousse Perlée.

German. Krauser Tang, Seetang.

Although the carrageen or Irish moss has long been used in Ireland, it was but little employed in other parts of Europe, or in this country, until within the last few years. Of late, it has been used precisely in those cases in which the Lichen Islandicus, or Iceland moss has been deemed appropriate. In Germany, the first trials were made with it in the year 1833, by Von Gräfe of Berlin, and the results were given to the world in his report for that year¹ of the Clinical surgical and ophthalmic Institute, attached to the Frederick William University.

The fucus crispus, which belongs to the natural family algæ, exists in the Atlantic Ocean, on the coasts of England, Ireland, western France, Spain and Portugal, and as far as the tropics. It is also a native of the United States. It is met with more abundantly, however, in Ireland, where it is used by the poor as an article of diet. It is thrown on the shore by the waves, and is gathered at the time of the ebb.

The Irish moss, when fresh, is green, and somewhat resembles the Iceland moss; but when dried, as we meet with it in commerce, it is of a bright yellow, and resembles laminæ of horn, crisped, translucent and frequently containing small shells, calcareous concretions, and grains of sand. It has not much taste; the smell seems to betray iodine, which, however, has not been detected in it. When the moss is chewed, it feels like so much cartilage, but, by the moisture and warmth of the mouth, it soon loses its brittleness. It contains little sea salt, but a good deal of sulphate of soda.²

The jelly obtained from it is transparent and colourless; its taste is by no means disagreeable; it keeps several days, and is not converted by muriatic acid into mucus, like the jelly which is obtained from land plants. In its nature it is esteemed to be nearly

¹ Bericht über das klinische chir. augenärztliche Institut. der k. Friedr. Wilh. Univers. für d. J. 1833. Berl. 1834.

² E. Gräfe in Art. Fucus, Encyclopäd. Wörterb. der medicinischen Wissenschaft. xiii. S. 1. Berlin, 1835.

allied to animal mucus.¹ It is easy of digestion, is readily borne by weak and irritable stomachs, and exerts a soothing influence on the air passages and the intestinal canal.

In order to obtain it, the moss is cut small, carefully cleared from impurities, boiled with the selected vehicle, and strained. Von Gräfe obtained, from nine ounces of milk boiled with half a dram of the moss, five ounces of jelly; and as much from a dram and a half of the moss and twelve ounces of water. The formula, commonly used by him, is given below. To this jelly may be added any dietetic or remedial agent, which may be considered indicated in the particular case.²

EFFECTS ON THE ECONOMY.

The fucus crispus is used in the affections that are considered to be benefited by the Iceland moss. As a diet, it is given in consumptive cases, and wherever there is erethism in the respiratory or digestive apparatus. In diarrhœa it is sometimes given along with astringent or other remedies. The jelly has been advised as a diet in scrofulous cases.

Von Gräfe affirms that he has often found it serviceable in hoarseness, in dry spasmodic cough, consumption, diarrhœa, and dysentery, in the intestinal pain, which remains after inflammation and ulceration of these parts, and after poison has been taken; in diseases accompanied by much emaciation, and in the prostration ensuing on serious diseases and operations. In similar affections it has been extolled by Hufeland.³ On the other hand, Heyfelder affirms that not only he, but many physicians of his acquaintance have used the moss without either good or evil results in phthisis, as well as in erethism of the respiratory and digestive organs; and Riecke⁴ remarks, that as it makes a very agreeable jelly, when boiled with milk, and with the addition of a little of the aqua laurocerasi, it may do for cases where we must prescribe "*ut fecisse aliquid videamur.*"

The truth is that it can render no more service than other substances which contain a similar principle, and accordingly but few

¹ Lucae, in Riecke, *Die neuern Arzneimittel*, S. 234. Stuttgart, 1837.

² See L. Feuchtwanger, in *Philad. Journ. of Pharm.* vi. 204. Philad. 1833-4.

³ Hufeland und Osann's *Journ. der practisch. Heilkund.* B. 77, St. 5, p. 135.

⁴ *Op. cit.* S. 235.

prescribe it with any other view than as a demulcent and nutritious aliment, in cases where such is needed.

MODE OF ADMINISTERING.

Decoctum Fuci Crispi.

Decoction of Irish Moss.

- ℞. Fuci crisp. elect. et concis. ℥ss.
Lact. vaccin. recent. ℥ix.
Coq. ad remanent. colatur. ℥v.

Adde

Sacchar. albissim. ℥ss. ad ℥i.
Aq. amygdal. amar. concentr. ℥i.

To be taken in the course of the day.

VON GRAEFE.

- ℞. Fuci crisp. elect. et concis. ℥iss.
Coq. cum aq. font. ℥xij. ad remanent. colat. ℥v.
Syrup. rubi. idæi ℥iss. ad ℥ij.
Aq. amygd. amar. concentr. ℥j.

To be used through the day. When employed as diet Von Gräfe allows from ten to eighteen ounces of the jelly in the day.

- ℞. Fuci crisp. (elect. et concis.) ℥ss.
Coque cum aq. font. q. s. ad reman. ℥vj.
Colatur. adde

Sodæ phosphat. ℥iss.
Syrup opii, ℥ij. ad ℥iij.

Dose.—A spoonful every two hours in cases of hæmoptysis, between the attacks.

CLARUS.

- ℞. Lactis vaccini, ℥xxiv.
Fuci crisp. ℥iv.
Sacch. alb. ℥j.
Cort. cinnam. cont. ℥j.

Coque per minut. x. leni igne; filtr. et exprime.

BERAL.

- ℞. Fuci crisp. (elect. et concis.) ℥ij.
Coque cum lactis ℥j. ad consist. gelatin.

Tere cum

Sacch. alb. ℥ij.
Amygdal. amar. No. 2.

To be used in the course of the day, and daily. HUFELAND.

FULIGO.

SYNONYMES.—*Fuligo Splendens*, F. Ligni, Soot, Woodsoot.

French.—Suie.

German.—Glanzruss, Spiegelruss, Kaminruss, Ofenruss, Russ.

The discovery of creosote, and its extensive application to the treatment of disease, gave occasion to the resuscitation of this article—much employed by the ancients, but subsequently fallen into oblivion.

The older physicians frequently used soot as an exciting, diaphoretic agent in cachexia of every kind, in chronic rheumatism, cutaneous affections, and especially in the evil results of their sudden repercussion; in glandular indurations, rickets, exostoses, &c. It has also been employed as a domestic remedy, in colic, and in the simple and dysenteric diarrhœa, and cholera of children. Several modern recommendations—as by Schütte and Weisenberg—remained unheeded until the attention of physicians was recently drawn to it, especially by Blaud.¹ He is of opinion, that the costly—and by no means easily prepared—creosote may be wholly replaced by soot. Both are products of the dry distillation of organic substances; their odours are analogous, and as soot is much cheaper and more easily obtained, it deserves, he thinks, to be tried more extensively in therapeutics. The soot has a nauseously empyreumatic, more or less bitter and acrid, saline taste.

EFFECTS ON THE ECONOMY.

Blaud² has exhibited the soot in different diseases, especially in the form of ointment, or in decoction, with excellent and rapid effects, in herpes, itch, tinea, gutta rosacea, and pruritus vulvæ; and he asserts, that he even healed a cancer of the breast by frequent ablution with a tepid decoction of it, and an ointment composed of equal parts of lard and soot with one eighth part of the extract of belladonna; but the same applications were of no benefit in a case of cancer of the nose, and in one of cancer of the uterus.

¹ *Revue Médicale*, Juin, 1834 et Janvier, 1835, and Dr. E. Gräfe, in Gräfe und Walther's Journal, xxiii. 310. Berlin, 1835.

² *Journal des Connaissances Médico-Chirurg.* Mai, 1834.

He also cured a scabby eruption of the mucous membrane of the nose by an ointment of soot. In diphtheritis, he used, in two cases, a decoction of soot as a mouth-wash with the best effects.

In confirmation of Blaud's remarks, Voisin asserts, that he cured a case of cancer of the face by the soot ointment.

Dr. J. R. Marinus¹ has found it very efficacious in chronic eruptions (dartres), and in tinea.

Carron du Villards² advises a collyrium prepared from soot in cases of strumous ophthalmia. He infuses two ounces of soot in boiling water, filters and evaporates to dryness; the shining residuum is then infused in very strong boiling vinegar, and to every twelve ounces of the liquid, twenty-four grains of extract of roses are added. A few drops of this solution, in a glass of tepid water, form an excellent resolutive collyrium, which may be made stronger or weaker at pleasure. He has, also, in cases of spots on the cornea, used soot—either blown into the eye alone, or mixed with powdered sugar-candy, and has seen good effects from it. United with butter it forms an eyesalve, not inferior, he says, perhaps to any other. As, in the treatment of specks on the cornea by dropping laudanum into the eye, the organ quickly becomes accustomed to it, Carron du Villards advises, that the eye should be excited to a more lively action by means of the combination of soot and tincture of opium given below. It is, he says, an energetic agent and may be applied by means of a pencil to the granulations on the cornea. He likewise recommends a decoction of soot as an injection in discharges which are the consequence of chronic inflammation of the vagina.

More recently, M. André Gibrin³ has detailed to the Académie Royale de Médecine of Paris, six cases of chronic inflammation of the bladder in which soot was beneficially used in the way of injection. He took from the chimney two ounces of compact soot, broke it up, washed it, and boiled it in a pound of water. The decoction was filtered through paper, and injected into the bladder twice a day. The good effects supervened so closely on the administration of the remedy, that there could be no doubt as to the cause. The pain ceased, and the patient obtained sleep, to which

¹ Bulletin Médical. Belge, Nov. 1838, p. 289.

² Gazette Médicale, Janvier, 1831; see, also, Baudelocque, on its use in Scrofulous Ophthalmia, in Bulletin Général de Thérapeutique. Mars, 1834.

³ Bulletin de l'Académie, 15 Mars, 1837.

he had been for some time a stranger. The urine gradually became clear, and recovered its natural appearance.

To these remarks it may be added, that, according to Schütte, an ointment composed of two parts of fresh butter or hog's lard, and one part of soot, is a popular and efficacious remedy on the Rhine for cases of porrigo, itch, and herpes; not more than a dram being rubbed in at a time. Weisenberg ascribes to the soot a protective power against contagious affections of the skin, and recommends, especially, lotions of soot water,—partly as a preventive agent, and partly as a therapeutical application in itch.

But the soot has not been used, of late, externally only; its internal use, in the form of the old "tincture of soot," has been revived. This was long known under the name of "soot drops" and "fit drops," and was employed as an antispasmodic in hysterical and other affections; but its employment has been extended, and it is given in chronic rheumatism, chronic affections of the chest, suppressed cutaneous eruptions, in many cases under precisely the same notions that prevailed years ago. From thirty to sixty drops of the following tincture are given several times in the course of the day.

MODE OF ADMINISTERING.

Mistura Fuliginis.

Tinctura Fuliginis (Clauderi.)

Mixture of Soot.

- ℞. Fulig. splend. ℥ss.
Potassæ carbonat. ℥iss.
Ammoniæ carb. ℥ij.
Aq. sambuc. ℥ix.

Digere leni calore. Filtra.

Dose.—From thirty to sixty drops several times a day.

Lotio Fuliginis.

Lotion of Soot.

- ℞. Fulig. splend. manip. maj. ij.

Coque cum aq. font. ℔j per semihoram. Cola cum expressione.

Used as a wash, several times a day, in herpetic, psoric and syphilitic ulcers.

BLAUD.

Unguentum Fuliginis.

Ointment of Soot.

- ℞. Fulig. splend.
 Adipis, aa. ℥ss.
 Extract. belladon. ℥j. M. exactè,

To be spread upon lint or tents in cases of cancers. BLAUD.

- ℞. Axung. porcine.
 Fulig. splend. aa. ℥ij.

Coque leni igne per horas vj.

As a dressing in cases of tinea, and of foul ulcers. BLAUD.

- ℞. Carbon. pulv.
 Sulph. depur. aa. ℥j.
 Fulig. splend.
 Cort. Peruv. flav. aa. ℥ss.
 Cerati simplicis q. s. ut fiat unguentum.

A dram to be rubbed in, once or twice a day, in cases of tinea.

CARRON DU VILLARDS.

- ℞. Opii, ℥ij.
 Caryoph. arom. ℥j.
 Fulig. splend. loti, ℥ss.
 Aq. cinnam. ℥viiij.
 Alcoholis, ℥iv.

Digest in a gentle heat for six days; filter and express the residuum.

Applied in cases of specks on the cornea.

CARRON DU VILLARDS.

- ℞. Fulig. ℥ij.
 Album. ovi, No. vj.

Tere simul.

As a dressing for herpes and tinea. It is the *Pommade résolutive* of Sainte Marie.¹

- ℞. Fulig. ℥iss.
 Zinci sulphat. ℥vj.
 Adipis, ℥iv. M.

Applied in cases of tinea. It is the *Pommade contre la teigne*, of Bories.²

¹ Nouveau Formulaire Médical et Pharmaceutique. Paris et Lyon, 1820.

² Formulaire de Montpellier. Montpellier, 1822.

GALEOPSIS GRANDIFLORA; (SUMMITATES.)

SYNONYMES.—*Galeopsis Ochroleuca*, *G. Villosa*, *G. Segetum*, *Herba Sideritidis*.

German.—Grossblüthigen Hohlzahns, Grossblumigte Hanfnessel.

This plant, which belongs to the natural family Labiatæ, and in the Linnæan system to *Didynamia Gymnospermia*, grows in the western part of Germany, in sandy cornfields.¹

EFFECTS ON THE ECONOMY.

The fresh plant has a peculiar, feeble, balsamic smell, and a somewhat bitter and saltish taste, and has been considered, in Germany, to be worthy of a distinguished place amongst the "bitter resolvents."

It has been much sold as a nostrum, under the name of "Blankenheimer Tea," (Blankenheimer Thee), or "Lieber's pectoral and phthisical herbs," (Liebersche Brust oder Auszehrungskräuter), and enjoyed great repute. In the Ardennes, also, particularly in the district of Malmedy, it has been long employed as a popular remedy. In the year 1828, Lejeune² directed attention to the therapeutical importance of this plant. According to his observation, it is very useful in diseases of the mucous membrane of the respiratory and digestive organs, and especially in chronic pulmonary catarrh, even when it exists to such a degree as to merit the name *Phthisis mucosa* (Schleimschwindsucht.) In actual phthi is the affection seemed to him to be diminished by it; the hectic being moderated, the expectoration rendered easier, or the cough assuaged.

Lejeune generally boiled half an ounce of the plant in a pint of water down to half; sweetened the decoction with sugar or honey, and directed the whole to be taken in the twenty-four hours. In other cases, in which a milk diet was appropriate, the decoction was made with an equal quantity of milk. Wesener³ found it advantageous in *phthisis mucosa*, and in chronic pulmonary catarrh. Günther, who had many opportunities for observing the

¹ Von Schlechtendal, in *Encyclopäd. Wörterb. der medicin. Wissenschaft.* xiii. 115. Berlin, 1835.

² *Annales Générales des Sciences physiques*, p. 331. Sepr. 1820.

³ Hufeland und Osann's *Journ. der pract. Heilk.* 1823 and 1824.

action of the remedy, affirms, that the Lieberschen Kräuter not unfrequently produced some amelioration in phthisis, especially in scrofulous phthisis, but he never saw any actual recovery therefrom. It seemed to him to moderate the colliquative sweats, and to facilitate and diminish the expectoration. In one case especially, of scrofulous phthisis, in the last stage, it appeared to be of essential service, and to prolong life; and from all his observations he is disposed to infer, that if it is not the sole or the main remedy to be employed in every stage of phthisis, it may be used with advantage throughout the disease as a supporting agent.

Riecke¹ asserts, that he has seen many cases in which the Lieberschen Kräuter were of great service in thoracic affections threatening phthisis. In one case, which promised to terminate unfavourably in a short time, owing to the complication of violent hæmoptysis with hectic fever, and in which an experienced physician had exhausted every effort of art, they were given with the best effect. The thoracic affection ceased, and at this time—a period of five or six years since the use of the remedy—the patient—an officer—is capable of performing his military duties without difficulty. On the other hand, Richter affirms, that in two cases in which he administered the galeopsis, no benefit resulted from it. In this country it has not been employed; so that we can only judge from the testimony afforded by the German writers. This, as they themselves admit,² is not yet sufficient to enable them to lay down any positive rules as to the exact indications and counter-indications that must regulate its employment. It is probably of no farther service than as a mild bitter, and its place may, therefore, be supplied, perhaps advantageously, by many of the tonics that are admitted into the lists of our remedial agents. Geiger³ subjected it to analysis, and found in it 2.765 parts of fatty matter, wax and chlorophylle; 0.247 of a brown bitterish resin, insoluble in ether; 0.312 of a yellowish stimulating and bitter resin, soluble in ether; yellow bitter extractive matter, soluble in ether, and a brownish matter insoluble therein; phosphate and malate of lime; salts of potassa; muco-saccharine matter and fecula, and 65.882 of ligneous matter.

¹ Die neuern Arzneimittel, u. s. w. S. 241. Stuttgart, 1837.

² Op. cit. S. 241.

³ Magaz. für Pharmacie, ix. 134.

METHOD OF ADMINISTERING.

℞. Summitat. galeopsid. grandif. ℥j.

Boil in a pint of water for a quarter of an hour and strain.

To be used in the twenty-four hours.

WESENER.

℞. Summitat. galeop. grandifl.

Rad. althææ, aa. ℥j.

— glycyrrhiz. ℥ij. — M.

The fourth part of this to be boiled in a pint and a half of water.

To be used daily in chronic catarrh, and in the expectoration produced by the softening of pulmonary tubercles. RADIUS.¹

The *galeopsis versicolor*, and the *galeopsis villosa*, which have also been examined by Geiger,² appear to be possessed of the same virtues as the *galeopsis grandiflora*.³

GENTIANINA.

SYNONYMES.—Gentianeina, Gentiana, Gentia, Gentianeine, Gentianinum, Gentianin, Gentianine.

The peculiar bitter principle of the root of the gentiana lutea, or yellow gentian, was discovered at the same time by M. Henry,⁴ Chef de la Pharmacie centrale of Paris, and by M. Caventou. Their results, indeed, were so identical, that it almost seemed as if they had acted in concert, and they therefore agreed to furnish them conjointly. According to these gentlemen, the gentiana lutea contains—1. A very fugacious odorous principle; 2. A yellow bitter principle, (gentianine;) 3. A matter identical with birdlime; 4. A fixed oil; 5. A greenish substance; 6. A free organic acid; 7. Uncrystallisable sugar; 8. Gum; 9. A yellow colouring matter; and, 10. Woody fibre.⁵ Schröder discovered, in addition, a resin-

¹ Auserlesene Heilformeln, u. s. w. Leipz. 1836.

² Allgem. med. Annalen, S. 1141. 1825.

³ Richter's Specielle Therapie, B. x. S. 397. Berlin, 1828.

⁴ Journal de Pharmacie, tom. v.

⁵ Journal Général de Médecine, tom. lxxiv, and Magendie's Formulaire.

ous and narcotic principle, and M. Planche affirms, that he detected the latter.

METHOD OF PREPARING.

Powdered gentian is digested in water in the cold. At the end of forty-eight hours a yellowish green tincture is obtained, which must be filtered, and the liquid be sufficiently concentrated by exposure to heat in an open vessel. It then forms, on cooling, a yellow crystalline mass, which possesses strongly the taste and odour of gentian. This mass is digested in alcohol, until it ceases to yield a lemon colour. The products of the washings are added together, and exposed to a slight heat; the yellow crystalline mass reappears, which, towards the end of the evaporation, becomes solid. The mass is very bitter. It is then redigested in weak alcohol, which redissolves all, except a certain quantity of oily matter. This last alcoholic solution contains, in addition to the bitter principle of the gentian, its odorous matter, and also an acid substance. By evaporating the liquor to dryness, dissolving the residue in water, adding a little well burned and washed magnesia thereto, and by boiling and evaporating in a water bath, the greater part of the odorous matter of the gentian may be driven off. The bitter acid is also taken up by the magnesia, and the yellow bitter principle remains partly free, and partly combined with the magnesia, to which it gives a beautiful yellow colour. The greater part of the bitter principle may then be obtained pure and isolated, by boiling the magnesia in ether, and evaporating the solution. If it be desirable to separate still more of the bitter principle, which the ether has failed to take from the magnesia, this may be done by digesting in enough oxalic acid to make the liquor acidulous. The acid unites with the magnesia, and the bitter principle which is set free may be obtained by the means above mentioned.

Gentianine is yellow, inodorous, and possesses very strongly the aromatic bitterness of gentian, especially when dissolved in an acid. It is very soluble in ether and in alcohol; and may be separated from them by spontaneous evaporation, in the form of very small, yellow, needle-like crystals. It is much less soluble in cold water, which it renders, however, very bitter. Boiling water has more action on it. Its colour is much deepened by the dilute alkalis, which dissolve rather more of it than water does. Acids weaken its yellow colour. Concentrated sulphuric acid carbonises it, and destroys its bitterness. When exposed in a glass tube to

the heat of boiling mercury, it is partly decomposed, and partly sublimed, in the form of small, yellow, crystalline needles. It does not sensibly change the colour of litmus paper, either when blue, or reddened by an acid, but seems to be neutral. Henry and Caventou esteem it an acid; Richard, an alkali.

It would seem that the experiments of MM. Trommsdorf and Leconte have demonstrated decisively, that gentianine, prepared according to the process of M. Henry, cannot be regarded as the active part of gentian.¹ Professor Dulk, of Konisberg, recommends the following process for separating it:—The coarse powder of the root is treated with alcohol; the alcohol is distilled off, and the residuum dissolved in water. The solution is filtered; and the undissolved matter, treated with ether, furnishes a clear tincture, from which, by spontaneous evaporation, is procured the gentianine of M. Henry, entirely insipid. The aqueous solution has a very bitter taste, and is fermented to separate the sugar, which cannot easily be done in any other manner. The liquid is then precipitated by the neutral acetate of lead; and the precipitate is separated: into the bitter liquid filtered is poured basic acetate of lead, and a little ammonia, to precipitate the combination of vegetable matter with the oxide of lead; but care must be taken not to add too much ammonia, because the latter, as a stronger base, will withdraw the vegetable matter from the oxide of lead. A yellow precipitate is obtained, which is washed in small quantities of water, as in a larger quantity the combination is decomposed. The precipitate is dissolved in water, and decomposed by a current of sulphuretted hydrogen gas. It is filtered, and the solution evaporated, at a moderate temperature, to dryness: the residue is treated with alcohol, s. g. .820; filtered, and by evaporation a mass is procured, which presents no trace of crystallisation.

This gentianine is a brownish yellow matter. Dried and triturated, it affords a yellow powder, and possesses the bitter taste of the root in the highest degree. It is hygrometric; almost insoluble in absolute alcohol; more soluble in common alcohol, and very soluble in water. It reddens litmus paper; heated, it melts, swells up, and burns without any residuum. It contains no azote. In its reaction and relation to bases, it approaches the acids.

¹ Journal de Pharmacie, Dec. 1838.

EFFECTS ON THE ECONOMY.

Gentianine, according to the experiments of Magendie, is not possessed of any poisonous qualities. Several grains, injected into the venous system, produced no apparent effect. He himself swallowed two grains dissolved in alcohol, and the only inconvenience which he experienced, was an extremely bitter taste, and a slight sense of heat in the stomach. It does not seem to possess any advantages over the gentian itself.

MODE OF ADMINISTERING.

Magendie recommends a tincture and a syrup. Either of them may be substituted for the officinal tincture of gentian, wherever the latter is considered to be indicated. The syrup he regards as one of the best bitters that can be prescribed in scrofulous affections, and he asserts, that he has observed permanently good effects from it. He does not give the dose of the gentianine,—which Radius¹ fixes at from one to four grains twice a day.

Tinctura Gentianinæ.

Tincture of Gentianine.

℞. Alcohol. 24° (.903) ℥j.
Gentianin. gr. v.

Digere.

MAGENDIE.

Syrupus Gentianinæ.

Syrup of Gentianine.

℞. Syrup. simplic. ℥j.
Gentianin. gr. xvj. M.

MAGENDIE.

¹ Auserlesene Heilformeln, u. s. w. Leipz. 1836.

GRANATUM (CORTEX RADICIS).

SYNONYMES. *Punica Granatum*, *Malogranatum*, *Pomegranate*, (the bark of the root.)

French. Grenadier, Balaustier.

German. Granatbaum. (Granatwurzelnrinde.)

The *Punica Granatum* appears to be a native of the northern coast of Africa, whence it was transported to Italy at the time of the Carthaginian wars. It is now cultivated in all civilised regions, where the climate is sufficiently warm to allow the fruit to ripen. It belongs to the natural family *Myrtaceæ*, and, in the Linnæan system, to the class *Icosandria*, order *Monogynia*.

All the parts of the plant contain more or less tannin. The bark of the root is externally of a yellowish gray or ash colour; internally it is yellow, and has an astringent taste. According to Latour de Trie,¹ it contains wax, chlorophylle, a considerable quantity of resin, gallic acid, tannin, fatty matter, and a peculiar matter called *Grenadine*,—in German, *Granatin*.

This *grenadine* is, in its pure state, of a white colour; inodorous, and of a sweetish taste; so much so indeed, that, according to Magendie, it might be presumed to be a variety of sugar, except that it differs from ordinary sugar in being devoid of the property of fermenting. According to the degree of its purity, it crystallises in grains, tufts or stars. When thrown on red-hot coals, it consumes without any residuum, and smells like burnt bread. It is fusible, and by a moderate heat may be almost wholly sublimed. It neither reacts as an acid nor an alkali, and is readily soluble in water. Cold alcohol dissolves only traces of it, but boiling alcohol dissolves it readily,—a property, which is to be taken advantage of in the formation of crystals. In ether it is insoluble. Nitric acid, with the assistance of heat, converts it into oxalic acid. An ounce of the bark yields six grains of the *grenadine*; but it is not settled, whether it contains the whole of the medical properties of the bark. Cenedella,² from whom we have the most recent analysis of the bark of the pomegranate root, also found the *grenadine* discovered by Latour. This substance is readily prepared. The bark in

¹ *Journal de Pharmacie*, Fév. 1828, p. 109.

² *Giornale di Farmacia*, Agosto, 1831, p. 55. See, also, *Journal de Pharmacie*, ix. 219; x. 352; and xvii. 503; and Prof. Dierbach, in *Heidelberg. klin. Annalen*, B. x. H. 3, S. 365. Heidelb. 1834.

powder is treated with ether, and afterwards with boiling alcohol, and the fluid is evaporated to the consistence of a soft extract. By treating this extract with water, the grenadine is dissolved without difficulty, and it may be purified by suffering it to crystallise frequently from alcohol.

EFFECTS ON THE ECONOMY.

The therapeutical properties of the different parts of the pomegranate tree were known to the writers of antiquity. They employed not only the bark of the root as a remedial agent, but also the flowers (*Flores Balaustiorum*, *Balaustes*, *Balaustia*,) "Balaustine Flowers," the whole fruit (*Poma Granati*, *Malo-Granata*, *Granata*, *Mala Punica*, Fr. *Grenades*.) "Pomegranate;" the rind of the fruit (*Malicorium*, *Malichorium*, *Malacorium*,) and the seeds. Dioscorides, Pliny, Celsus and Marcellus Empiricus speak of the employment of the bark of the root in tænia.¹ In more modern times, the *Punica granatum* had been greatly neglected, although the juice of the fruit was recommended by Frederick Hoffman against worms in children. In India, it has been long held in great estimation as a remedy in cases of tape-worm, and its efficacy having been noticed by some English physicians, it was recommended to the attention of European physicians, especially by Buchanan,² Fleming and Breton.³ About the same time, a monograph was published by Gomez, a Portuguese physician, which appears to have had considerable agency in extending the reputation of the remedy, especially in Germany, where the monograph was translated into the *Journal of Gerson and Julius*.⁴ Gomez directs two ounces of the fresh rind of the root to be boiled in a pint and a half of water down to a pint; and of this decoction two or three spoonfuls to be taken for a dose; the first early in the morning fasting, and then every half hour until the whole is used. The efficacy of the preparation he tested on fourteen cases, from which it appeared, that the worm could not withstand the action of the remedy more than forty-eight hours. He found it to exert most efficacy, when portions of the worm were perceptible in the

¹ Mérat & De Lens, Dict. de Mat. Médical. Art. *Punica Granatum*.

² Edinb. Med. and Surg. Journal, iii. 22, 1827.

³ Medico-Chirurg. Transact. xi. 31.

⁴ Magazin, u. s. w. vi. 427, and Journal Complémentaire des Sciences Médicales, xvi. 24, 1823.

evacuations, a period when the patient generally suffers most inconvenience. If the exit of the worm did not take place on the first day, after the use of the agent, the decoction was continued on the second day, when the worm was generally discharged. Did this, however, not happen, a farther continuance of the remedy was of no avail; and he thought it better to intermit it until the appearance of fresh portions of the worm in the evacuations. Gomez also administers the dried rind in pills. If the dose be too large, or the appropriate dose be too frequently repeated, nausea, vomiting and diarrhœa at times supervene; should this be the case, the proper course is obvious.

In countries, where the fresh rind can be obtained, Gomez advises, that it should be used; in colder countries, the dried rind, which is obtained from more southern regions, will have to be employed.

According to Breton, the latter acts more powerfully; the dried rind loses more than half its weight, and two ounces of it may be esteemed equal to three of the fresh.

The strong testimony, adduced in its favour by Gomez, gave occasion to numerous trials with it in England, France, Germany and Italy, which were generally attended with favourable results. Such favourable testimony has been afforded by Boiti, Marchese, Calabro, Majoli, Chevallier, Deslandes, Mérat,¹ Pichonnier, Mandrux, Claret, Bayle, Delaporte, Gendrin, Grimaud, Chapotin, Bourgeoise, Housson, Goupil, Ferrus, Wolff, Köstler, Meisinger, Berthold, and others.² On the other hand, Keibel³ complains of its uncertainty; and, in the Polyclinical Institute of the University of Berlin, it was given without advantage; but Osann, in his report of that institution, is disposed to refer the want of success to some imperfection in the rind employed, which, he remarks, is found to vary greatly in its character, as met with in the shop of the apothecary. It would appear, also, that it is not unfrequently mixed with the rind of the root of the Boxtree, and the Guelder rose (Wasserhollunder.)

To introduce more precision on this matter, Wolff recommends that the druggists should purchase the bark of the root of the

¹ Du *Tænia* &c. et de sa cure radicale par l'écorce de la racine de Grenadier. Paris, 1832; and Mérat & De Lens. Op. cit.

² Riecke, *Die neuern Arzneimittel*, S. 247.

³ *Rust's Magazin*, xvi. St. 3. S. 566.

genuine East India, or at all events the Portuguese, tree. Boiti¹ advises that the root should be obtained from mountainous regions, where the tree grows wild; that it should be taken only from young trees, and that it should not be more than an inch thick, that it should be carefully separated from the woody portion, and be collected in the spring of the year, when the tree has most sap, and be dried in the shade. Chevallier,² also advises, that only the rind of the root of the wild tree should be used. Gendrin, Montault and Pichonnier all affirm, that the fresh rind was alone certain in its operation; the dry frequently disappointing them. According to Breton, the rind of the trunk is to be preferred to that of the root, because it preserves its virtues longer. Chevallier recommends, before the decoction of the pomegranate tree bark is administered, that a gentle cathartic of castor oil with lemon juice should be premised. This may be taken the evening before, the patient fasting during the following day. The decoction he directs to be made of two ounces of the rind macerated for twenty-four hours, in two pints of water, and then boiled until a pint of the strained liquor remains. This must be divided into three portions, which are taken in half hourly doses. The first and second doses with many persons excite vomiting, but this need not prevent the administration of the third, as it rarely produces the same effect. This quantity of the decoction commonly occasions three or four evacuations, preceded by slight colic pains; at other times, but one evacuation is produced, with which the worm is usually expelled. The period that elapses between the administration of the last dose of the remedy and the commencement of its operation is from a quarter of an hour to a whole hour—rarely longer.

Cenedella advises that the bark of the root should be macerated before boiling; that the decoction should be made in earthen, not in metallic, vessels, and that it should be filtered or strained whilst hot, different constituents—which are probably efficacious—being deposited as the liquor cools.

According to Constant, the rind is commonly prepared in France in the following manner.

The rind of the fresh root—or the bruised root dried—is macerated through the night in from a pint and a half to a quart of water; the liquor is then boiled to one half, strained, and in the morning, a third part is taken lukewarm, fasting, and repeated

¹ *Revue Encyclop.* xxxii. 234.

² *Journal de Chimie Médicale*, i. 378; 1825.

every three hours until the whole has been administered. The quantity of the rind, used for the decoction, is, in the case of the adult, ℥j; of children, from six to fifteen years old, ℥vj; and of those under six years of age, ℥ss. At times, however, it has been administered in much larger doses. A girl, twenty-four years of age, had suffered from tænia from her infancy and had frequently passed fragments of worms in her evacuations. She took two ounces of the bruised bark of the pomegranate root, boiled in two pounds of water, at thrice, with half an hour's interval between the doses, but without effect. The dose was now increased to three ounces, and two tapeworms were expelled; so that in two days, and without any abdominal disturbance, the patient took the decoction of five ounces of the bark of pomegranate root.¹

To ensure the proper action of the decoction, it must be given as directed above, without the addition of sugar or syrup, which changes its properties. During its operation, the patient should drink nothing, except when the tormina are urgent, and then a little of any aromatised water, without sugar, may be taken. The remedy should be given only on days in which portions of tænia are evacuated, or on the following morning; and the alimentary canal should be free from every evidence of inflammatory irritation. By some, as by Latour de Trie, and Ferrus, an infusion of the rind has been found serviceable; and Deslandes recommends an *Extractum spirituosum*, and an *Extractum aquosum corticis radices granatorum*.

Ferrus, Berthold, Goupil, and others, have published cases in which, along with the expulsion of the tænia, various neuroses were removed under the use of the rind, and accordingly it has been thought, that it might be usefully employed in such affections where no tænia exists;—in epilepsy and hysteria, for example.

Decoctum Corticis Radicis Granati.

Decoction of Pomegranate Root Bark.

℞. Corticis radices granati, ℥ij.

Aquæ, ℥ij.

Boil to a pint and a half.

Dose.—℥ij every half hour. Three or four doses are usually

¹ Professor Forget, in Gazette des Hôpitaux, Fév. 19, 1839, and Lond. Med. Gazette, Apl. 20, 1839.

sufficient to expel the worm.¹ The formula, quoted by Dr. Paris² from Dr. Ainslie's *Materia Medica of Hindostan*, directs the decoction to be prepared with ℥ij of the fresh bark, boiled in a pint and a half of water, until only three quarters of a pint remain.

Electuarium Corticis Radicis Granati.

Electuary of Pomegranate Root Bark.

- ℞. Extract. spirit. cort. rad. granat. ℥vj.
 Aquæ florum tiliæ³
 Succ. citr. aa. ℥ij.
 Gum. tragac. q. s. ut fiat electuarium.

Dose.—One half, from half hour to half hour. DESLANDES.

Mistura Extracti Corticis Radicis Granati.

Mixture of Pomegranate Root Bark.

- ℞. Extract. spirit. cort. rad. granat. ℥vj.
 Aquæ menthæ,
 Aquæ flor. tiliæ,³
 Succ. citr. aa. ℥ij. M.

To be divided into four parts, one of which may be taken every quarter of an hour. DESLANDES.

GUACO.

SYNONYMES.—Huaco, Eupatorium Huaco.

It would appear, that owing to some extracts in the *Allgemeine Zeitung*, the attention of the German physicians had been directed to this article as an important agent in the cure of epidemic cholera; and various testimonials have been brought forward in its favour, which, as Riecke⁴ properly suggests, may not be confirmed by farther experience, and yet the circumstance may have led to the introduction of a valuable article into the catalogue of medicinal agents.

¹ Jourdan's *Pharmacopée Universelle*, i. 638. Paris, 1828.

² *Pharmacologia*, Beck's American Edition, p. 380. New York, 1831.

³ Any simple aromatic water may be substituted for this.

⁴ *Die neuern Arzneimittel*, u. s. w. S. 250. Stuttgart, 1837.

Many species of the genus *Eupatorium*, and of the kindred genus *Mikania*,—which has been recently separated from it, belonging to the natural family Compositæ, (Synanthereæ, subdivision Corymbifereæ,) and, in the Linnæan system, to Syn-*genesia* *Æqualis*, have been prized in various parts of America, especially in cases of the bites of serpents. This is especially the case with the *Eupatorium ayapana*, (*E. triplinerve*.) According to Martius, a quantity of the bruised leaves is applied to the scarified wound, and the application of fresh leaves is renewed, over and over again, until the patient is freed from the dangerous symptoms, and especially from the violent suffering. At the same time, a few spoonfuls of the expressed juice are administered every now and then. The *Mikania opifera*, (*Eupatorium crenatum*,)—in Brazil termed *Erva da cobra*—and the *Eupatorium saturejæ-folium*, (*Mikania saturejæfolia*,) also belong to the many Synanthereæ, which, in South America, are reputed specifics against the bites of serpents. The most important species appears to be that called, in Peru, *Guaco*, or *Huaco*, which is held there in high consideration, as well as in Colombia, New Grenada, and Venezuela, not only in these cases, but in the prevention of hydrophobia.¹ This is presumed to be the mikania guaco of Humboldt.

The guaco was made known to us, forty or fifty years ago, by Mutis,² who refers to its effects in cases of the bites of serpents.

EFFECTS ON THE ECONOMY.

Of the efficacy of the guaco in the Indian cholera, M. E. de Chaniac, *Officier de Santé* in the French navy, and Dr. Chabert, physician to the military hospital in Mexico, have published the results of their experience. When the brig Adonis, on her voyage from Havana to Mexico, in the year 1833, arrived at Vera Cruz, some of her crew were attacked with the cholera, which prevailed at the time in Mexico. Of all the remedies employed, the guaco was found the most beneficial; its effects, indeed, were so wonderful,

¹ See W. R. Johnson, in Silliman's Journal, xxiv. 279 and 388, New Haven, 1833; and Ibid. xxvii. 171, New Haven, 1835; also, Dr. Hancock, in Quarterly Journal of Science, &c. from January to June, 1830, p. 333. Dr. Hancock affirms, that the names *Guaco* and *Bejuco de Guaco* were given—in the parts of America where he sojourned—to different species of *Aristolochia*.

² Virey, in Bulletin de la Société de Pharmacie, vi. 241; and Riecke, Op. cit. 251.

that it was regarded almost as a specific. Its action is chiefly exerted on the heart and the circulation, which it renders more energetic. All the patients, to whom it was exhibited in the commencement of the disease, were saved, and even of those, in whom the cholera had already reached a certain stage, the greater part were saved, as soon as a free and complete reaction was established.

Dr. Chabert, who first administered the guaco in cholera, as well as in yellow fever, observes on its use in the former disease:—In simple cases, a small tea-cupful of a warm decoction of guaco was given every half hour, until a general diaphoresis and proper warmth of surface supervened, which was kept up for some days, when the remedy was gradually discontinued. To allay the thirst, the decoction was given, diluted with two-thirds, or half, water. In dangerous cases of cholera algida, with coldness, loss of pulse, &c., a spoonful of the spirituous tincture was mixed with six or eight spoonfuls of water, and, every quarter of an hour, a spoonful of this mixture was given alternately with a small cupful of the decoction. When the pulse returned, the warmth became restored, and the perspiration re-established; the tincture was omitted, and the decoction continued alone at longer intervals. In the majority of cases, after the cessation of the cholera symptoms, pain was experienced in the epigastrium, with burning thirst, which yielded when the decoction was diluted with half or two-thirds water. When the decoction could not be retained by the stomach, it was given in clyster. Bloodletting, general and local, was employed along with other external means, but nothing was given internally, except the guaco. To make the decoction;—two drams of the stalks, and half a dram of the leaves, were boiled in two pints of water, down to one. The tincture was prepared like other tinctures.

In consequence of the communications of Chabert and De Charniac, as well as of the parallel drawn by Harless,¹ between the cholera and the effects of the bites of serpents, Professor Beckers, of München, recommended that experiments should be made with the guaco; and it was accordingly tried in München, but not with as favourable results as had been expected. Romerio asserts, that it was given in the *stadium asphycticum*, in the form of infusion, made of half an ounce of the stalks, but with uncertain results. It appeared to combine the effects of the valerian and ipecacuanha, yet

¹ Die Indische Cholera u. s. w. Braunschweig, 1831.

it excited less vomiting than the latter. The tincture appeared to render greater service. It was given in the dose of a coffee-spoonful every half hour, and, subsequently, every hour, and every two hours. It would appear, that in the district of Prague, its administration was attended with very favourable consequences.¹ To account for the different results, it is affirmed, that different drugs are met with in commerce under the name guaco. Riecke says, that M. Jobst had sent him two kinds, which were evidently from different plants; the one variety was obtained from Hamburg and Bordeaux, the other from Paris; descriptions of which are given by Riecke. The truth, probably, is, that this, like most of the cholera specifics which have been brought forward, is efficacious in certain cases of the disease, but that its efficacy has been egregiously exaggerated.

HIPPOCASTANUM, (CORTEX.)

SYNONYMES.—*Æsculus Hippocastanum*, *Castanea Equina*, *C. Pavina*, Horse Chestnut, Buck Eye, (the Bark.)

French.—Marronnier, Marronnier d'Inde.

German.—Rosscastanien, (Rinde.)

The tree, whence this bark is derived, is the *Æsculus Hippocastanum*, or Horse Chestnut—of the natural family Hippocastaneæ; in the Linnæan system, class Heptandria, order Monogynia—which is wild on the mountains of Asia Minor and Persia, and grows in this country, as well as in Europe. The bark has a very astringent taste, is somewhat bitter, and contains a great deal of tannin. Canzoneri thinks he discovered a peculiar principle in it, which he calls *Æsculine*, but the existence of this is contested.

EFFECTS ON THE ECONOMY.

The cortex hippocastani has long been advised as an astringent, but without receiving much attention.² In modern times, it has been proposed by Zannichelli, Hufeland, Voigtel, and others, as

¹ Riecke, Op. cit. S. 256.

² Mérat & De Lens, Art. *Æsculus Hippocastanum*.

the best substitute for the cinchona. These recommendations have caused the bark to be more frequently administered of late, in Europe, by which means it has been discovered to accord almost entirely in its effects with the willow bark; the latter, however, appears to be more effective, and to agree better with the digestive organs. In the wars of Napoleon, when bark was very scarce, it was much employed.

Hufeland and Voigtel recommend it, especially in intermittents. Sinogowitz¹ advises that it should be given after the removal of intermittents by the quinine, to prevent a relapse; and, also, in combination with diuretic agents, in the cases of dropsy which often succeed that disease. Krügelstein found it always extremely efficacious in atonic gout, and in removing the weakness of the digestive apparatus that remains after attacks of gout. The Austrian, Brunswick, Danish, Russian, and Saxon pharmacopœias² have an aqueous extract of the bark, which Voigtel administered with good results in intermittent fever, and which he often found serviceable in chronic discharges from the mucous membranes. It agrees better with the stomach than the powder or the decoction. Externally, the decoction has been advised as a good astringent.

MODE OF ADMINISTERING.

Decoctum Corticis Hippocastani.

Decoction of Horse Chestnut Bark.

℞. Cort. hippocastan. ℥iss.

Coque cum aquæ commun. ℥xviiij. ad reman. colat. ℥ix; cui refrigerat. adde
Spir. sulph. æther. ℥j—ij.

Syr. cort. aurant. ℥j. M.

To be used during the apyrexia.

VOIGTEL.

Pulvis Chinæ Factitiuus.

Factitious Powder of Bark.

℞. Cortic. hippocast.

— salic.

— gentian. rubr.

Calam. arom.

Caryophyll. aa. ℥ij.

Misce et fiat pulvis.

¹ Rust's Magazin, B. xxix. H. i. p. 84.

² Pharmacopée Universelle, ii. 14. Paris, 1828.

Hufeland¹ affirms, that this powder is an adequate substitute for the cinchona in three cases out of four.

HUFELAND, AND PRUSSIAN PHARMACOPŒIA.

Decoctum Chinæ Factitiæ.

Decoction of Factitious Bark.

℞. Pulv. gross. cort. salic.
 ————— hippocast. aa. ℥ss.

Rad. calam.

Caryophyll. aa. ℥ij.

Coque cum aq. fontan. ℥xvi. ad reman. colat. ℥viiij.

PRUSSIAN PHARMACOPŒIA.

Decoctum Hippocastani Acidum.

Acid Decoction of Horse Chestnut.

℞. Cort. hippocast. pulv. ℥vj.
 Coque cum

Acid. sulphur. dilut. ℥j et

Aquæ font. ℥x.

Ad colat. ℥vj.

Used in the after treatment of intermittents. SINOGOWITZ.

Electuarium Corticis Hippocastani.

Electuary of Horse Chestnut Bark.

℞. Cort. hippocast. pulv. ℥ss.

Rad. calam. aromat. ℥ss.

Roob. juniperi, ℥iij. M. fiat electuarium.

A tea-spoonful to be taken every hour, or every two hours, in dropsies supervening on intermittent fever. SINOGOWITZ.

¹ Armenpharmacopoe. 4te Ausgab. Berl. 1825.

HYDRARGYRI PRÆPARATA.

SYNONYMES.—Preparations of Mercury.

French.—Les Préparations de Mercure.

German.—Quecksilberpräparate.

I. HYDRARGYRI BROMIDUM.

SYNONYMES.—Hydrargyrum Bromatum, Bromide of Mercury.

German.—Bromquecksilber.

Mercury unites with bromine in more than one proportion. A solution of hydrobromate of potassa produces, with a solution of nitrate of protoxide of mercury, a white precipitate, which resembles calomel; and appears to be a bromide of quicksilver, answering to the protoxide; (*Hydrargyrum Bromatum*, *Hydrargyri Protobromidum*; German, *Quecksilberbromür*.) On the other hand, the bromide which is formed by the direct union of bromine with mercury, corresponds probably to the peroxide. A white substance results, which can be sublimed by heat, is soluble in water, alcohol, and especially in ether; is coloured red or yellow by the alkalies, and exhibits considerable resemblance to corrosive sublimate; (*Hydrargyrum perbromatum*, *H. perbromidum*, *H. deutobromidum*. German, *Quecksilberbromid*.)

EFFECTS ON THE ECONOMY.

The effects of these preparations on the sound and diseased organism are not yet well known. They have, however, been employed by some physicians. The *protobromide* strongly resembles calomel in its properties. In the dose of one or two grains, it produces no effect in health, even when taken fasting. In a higher dose—four or five grains, and upwards—it purges moderately, augmenting, at the same time, the secretion of urine. When used in recent syphilitic affections, in the way of friction on the gums, or internally, in the form of pill, it cures them like calomel; but it does not seem to affect the mouth as speedily or as severely as calomel.¹

The *deutobromide* resembles the bichloride of mercury in its

¹ Bulletin Général de Thérapeutique, No. 14, Juillet 30, 1837.

action,—producing, in too strong a dose, vomiting and purging, with colic and cramp of the stomach; affecting the mouth, and exciting violent salivation. Werneck, of Austria, has administered it frequently in syphilis. In recent cases, he prescribes the deutobromide in the form of pill, beginning with the one-twentieth of a grain. This dose he increases by two twenty-fifths every two days; the chancres being covered at the same time with compresses, wetted with a solution formed of six grains of the same substance to a pint of distilled water. After a few days' treatment, he remarked, that the sores assumed a better appearance; and from twenty to thirty days were sufficient to effect their entire cicatrization: the total quantity of the bromide administered was about five grains. It was rarely necessary to carry it as high as ten or twelve grains. It has been believed that the deutobromide of mercury is less liable to affect the salivary glands than the deutochloride of mercury, and to affect less severely the stomach and chest.¹

Desorgues has recommended the second (?) preparation as a prophylactic and curative agent in syphilis. It was, doubtless, also, Riecke suggests—the second preparation, which was administered with excellent effects by Prieger, in porrigo favosa, of an obstinate character. He terms the preparation *bromas mercurii*, but the true bromate is probably insoluble in ether.² The first of the following formulæ is recommended by Prieger.

Guttæ Hydrargyri Perbromidi.

Drops of Perbromide of Mercury.

℞. Bromatis mercurii, (vel potius hydrargyri perbromidi,) gr. vj.

Solve in

Æther. sulphuric. ℥iij. M.

Dose.—Ten to twenty drops, according to the age of the patient, daily, in water.

℞. Hydrargyr. deuto-bromid. gr. j.

Æther. sulphuric. ℥j. M.

Dose.—Ten to twenty drops in barley water, a short time after taking dinner;—in syphilis.

WERNECK.

¹ Bulletin Général de Thérapeutique, No. 14, Juillet 30, 1837.

² Die neuern Arzneimittel, S. 261. Stuttgart, 1837.

II. HYDRARGYRI CYANURETUM.

SYNONYMES.—Hydrargyri Prussias, H. Bicyanidum, H. Borussias, Hydrargyrum Cyanogenatum, H. Hydrocyanicum, Cyanide, or Prussiate, or Hydrocyanate, or Bicyanide of Mercury.

French.—Cyanure ou Hydrocyanate ou Prussiate de Mercure.

German.—Cyanquecksilber, Blaustoffquecksilber, Blausaures Quecksilber.

This mercurial preparation is contained in the pharmacopœias of the United States, Dublin, London, Belgium, Paris, Ferrara, &c.

METHOD OF PREPARING.

According to Proust and Gay-Lussac, two parts of good and finely powdered Prussian blue must be boiled with one part of deutoxide of mercury and eight parts of water, until the mixture acquires a bright yellowish tint. It is then filtered; and the filtered liquor, which is the hydrocyanate of deutoxide of mercury—containing, however, some iron—is digested or boiled with an excess of the deutoxide of mercury, whereby the oxide of iron is completely precipitated. As, however, the hydrocyanate is combined with an excess of the oxide of mercury, this must be saturated with free hydrocyanic acid, and the solution be evaporated to induce crystallisation. In this mode the cyanide is formed.

The formula of the Pharmacopœia of the United States, into which the cyanuret has been introduced to serve in the preparation of the hydrocyanic acid, is the same as that adopted in the Codex Medicamentarius of Paris, which was recommended by Berzelius. It is as follows:—

Take of red oxide of mercury, three ounces; ferrocyanate of iron, (Prussian blue,) six ounces; distilled water, three pints. Put the oxide of mercury and the ferrocyanate of iron, previously powdered and thoroughly mixed together, into a glass vessel; and pour upon them two pints of the distilled water. Then boil the mixture, stirring constantly, till it becomes of a yellowish colour; after which filter through paper. Wash the residue in a pint of the distilled water, and filter as before. Mix the solutions, and evaporate by the fire till a pellicle appears; then set the liquor aside that crystals may form. To purify the crystals, dissolve them again in dis-

tilled water; filter; evaporate the solution, and set it aside to crystallise.¹

The former of these methods is, doubtless, the best, as it ensures uniformity, whilst the Prussian blue of commerce being of variable strength, the cyanuret, made after the latter formula, must be so likewise.

Schräder directs it to be prepared by mixing a solution of the red oxide or deutoxide of mercury with hydrocyanic acid, filtering and evaporating.²

The cyanuret of mercury forms white, opaque, four-sided prisms. It is inodorous, and its taste is extremely disagreeable and metallic. It is decomposed by heat; is readily soluble in water, and becomes converted thereby into hydrocyanate of mercury. It is insoluble in alcohol.

The cyanuret of mercury contains, at times, ferrohydrocyanate of potassa, proceeding from the Prussian blue, with which it has been prepared.³

EFFECTS ON THE ECONOMY IN HEALTH.

According to Coullon, the poisonous action of the cyanuret of mercury is as rapid as that of the hydrocyanic acid; but, in the dose of from two to five grains, M. Ittner found it produce on dogs only signs of indisposition, tremors, &c.⁴ It is one of the substances which Magendie,⁵ in his experiments, found to promote the coagulation of the blood.

EFFECTS ON THE ECONOMY IN DISEASE.

Parent,⁵ who frequently used this preparation, prefers it greatly to corrosive sublimate, in consequence of its greater solubility, and the capability of more readily affecting the organism by it. In his

¹ Wood and Bache's Dispensatory, Art. Hydrargyri Cyanuretum; see, also, Mr. Ellis, in Journal of the Philadelphia College of Pharmacy, vi. 24. Philad. 1834-5.

² See a new process for its preparation, by MM. Chevallier and Deleschamps, in Journ. de Chimie Médicale, Janv. 1830.

³ Orfila, Toxicologie, i. 331.

⁴ Mérat & De Lens, Dict. de Mat. Méd. Art. Cyanogène.

⁵ Leçons sur le Sang; and translation in Lond. Lancet, Jan. 20th, 1839, p. 636.

⁶ Journ. de Chimie Médicale, viii. 473.

experience, syphilis yields more readily under its use than under that of any of the mercurials. He did not observe pains in the abdomen accompanying its protracted employment, which he so frequently witnessed when the sublimate was taken. Another advantage which it possesses, is, that it is not so readily decomposed. No salt, no alkali—not even caustic alkali—disturbs it; neither do substances that contain azote or gallic acid, which speedily convert the sublimate into calomel. Moreover, the cyanuret of mercury appears to act on the animal textures differently from sublimate. When the latter is placed in contact with flesh, it becomes quickly changed, in part, into calomel; whilst the cyanuret preserves the flesh equally well, without being decomposed. The hydrocyanic acid appears to play no important part in the action of the remedy. According to Olivier's experiments,¹ the cyanuret, like the corrosive sublimate, acts as a powerful excitant to the tissues on which it is applied. He saw a man destroyed by inflammation of the intestines, who had taken twenty-three grains of it.

The cyanuret of mercury was first, perhaps, recommended in Italy, (Brera), and Spain. Mendoza especially made many trials with it, from which he was induced to conclude, that it is the best agent we possess in venereal affections—an opinion in which he was joined by several of his professional brethren in Malaga. He advises, that laudanum should be added to it, on account of its liability to excite vomiting. When too large doses were administered, or when the patient was unusually impressible, Mendoza found that the nervous system became especially disordered—as indicated by syncope, oppression, anxiety, and convulsions. Chaussier, likewise, as well as Thaer and Horn proposed the cyanuret as a remedial agent at an early period. On the other hand, Wendt, Cullerier, and Plisson complain of its little efficacy; whence it has been inferred that the preparation must differ; when prepared, indeed, according to the first form, it always contains more or less iron.²

Neumann³ advised it in chronic inflammation of the lungs, and of the membranous organs of the chest, abdomen and ovaries. In particular cases, its use has to be soon pretermitted, in consequence of its powerful action, even in small doses—as one eighth of a grain three times a day—on the salivary glands. In other cases, it can

¹ Journal de Chimie Médicale, i. 269.

² Riecke, Die neuern Arzneimittel, u. s. w. S. 264. Stuttgart, 1837.

³ Hufeland und Osann's Journal, lv. 66.

be continued long without the supervention of any unpleasant consequences. In the Charité, at Berlin, it was used with advantage in a case of obstinate cephalalgia, the origin of which was syphilitic.

Bielt has employed it externally—in the form of the ointment given below—in cases of humid tetter, accompanied with inflammation and itching. Parent recommends it to be applied in cases of chancre, and Brera uses it in solution, as a gargle, in syphilitic ulceration of the fauces.

MODE OF ADMINISTERING.

The cyanuret of mercury may be given in pills or in solution; Horn gave it in powder, but this form is less appropriate. The dose is from one sixteenth of a grain to a grain several times a day. As a gargle, half a grain to a grain may be dissolved in ℥j of water; as an ointment from one and a half to two grains to ℥j of lard. Chaussier used it in friction on the soles of the feet, in the same way as the corrosive sublimate.

Solutio Hydrargyri Cyanureti.

Solution of Cyanide of Mercury.

(SYNONYME.—Liqueur Antisyphilitique de Chaussier.)

℞. Hydrargyri cyanuret. gr. viij.

Aquæ distillat. ℥j.

Each ounce contains half a grain of the cyanuret.

CHAUSSIER¹ AND PARENT.

℞. Hydrarg. cyanuret. ℥ss.

Solve in

Aq. distillat. ℥j.

Adde

Tincturæ opii, ℥j. M.

Dose.—Morning and evening, a spoonful, in a decoction of sarsaparilla or barley.

MENDOZA AND PARENT.

¹ Rattier, *Formulaire Pratique des Hôpitaux civils de Paris*, 3ème édit. Paris, 1827.

Pilulæ Hydrargyri Cyanureti.

Pills of Cyanide of Mercury.

- ℞. Hydrarg. cyanuret. gr. v.
 Opii puri, ℥ss.
 Micæ panis, ʒj.
 Mellis, q. s. ut fiant pilulæ xcvj.

Dose.—One to four, three times a day.

PARENT.

Gargarisma Hydrargyri Cyanureti.

Gargle of Cyanide of Mercury.

- ℞. Hydrarg. cyanuret. ℥ss.
 Decoct. len. sem. lini, (vel rad. althææ), ℔j.

M. et fiat gargarisma.

PARENT.

- ℞. Hydrarg. cyanur. ℥ss.
 Decoct. hordei, ℔j.
 Mellis rosati, ʒj. M. et fiat gargarisma.

BRERA.

Unguentum Hydrargyri Cyanureti.

Ointment of Cyanide of Mercury.

- ℞. Hydrarg. cyanur. gr. xij.
 Adipis, ʒj. M. et fiat unguentum.

BRERA.

- ℞. Hydrarg. cyanuret. gr. xvj.
 Adipis, ʒj.
 Ol. limonis, gtt. xv. M.

From half a dram to a dram, to be rubbed in, in cases of tetter.

BIETT.

III. HYDRARGYRI PROTO-IODURETUM.

SYNONYMES.—Hydrargyrum Iodatum flavum, H. Iodidum, H. Iodidulatum, H. Iodatum (in contradistinction to the Periodatum), Iodidum Hydrargyrosus, Hydrargyri Proto-iodidum, Proto-iodide or Proto-ioduret of Mercury.

French.—Proto-iodure de Mercure.

German.—Gelbes Iodquecksilber, Gelbes Quecksilberiodid, Protoiodür des Quecksilbers, Quecksilberiodidul, Iodquecksilber im Minimum des Iods.

METHOD OF PREPARING.

According to Tünnermann, the best method of preparing the Proto-ioduret is the following:—Take of the nitrate of protoxide of mercury, (not tinged yellow by the admixture of the nitrate of peroxide) 28.25 parts, and 16.5 parts of iodide of potassium; rub them together for some minutes in the dry state, and afterwards with a little distilled water, gradually adding the water so as to dissolve the saltpetre formed. The mixture is then passed through the filter, and the yellowish green precipitate of iodide of mercury is well washed, and then dried by a gentle heat.

The objection to this process is the difficulty of obtaining the mercurial salt at a minimum of oxidation, and the consequent liability of the resulting compound to contain uncertain quantities of the deuto-iodide. M. Boutigny¹ to avoid these disadvantages recommends the following form.

℞. Hydrarg. proto-chlorid. ℥iij & ℥v.
Potassii iodidi, ℥ij & ℥iv.

Pulverise the iodide in a glass mortar, and add the calomel; place the mixture in a porcelain capsule, and pour over it ten or twelve ounces of boiling distilled water. After cooling, decant the fluid, collect the precipitate on a filter, and wash with distilled water. Dry in the shade and keep in a well-stopped bottle.

The proto-iodide, thus prepared, may, according to M. Boutigny, sometimes contain a minute portion of mercury or its protochloride, but the quantity of either is so small as to be of no moment.

In the new London Pharmacopœia, it is prepared by rubbing together an ounce of mercury and five drams of iodine, adding gradu-

¹ Bulletin Général de Thérapeutique, and American Journ. of Pharmacy, 2d vol. 2d series, p. 326. Philad. 1837.

ally as much alcohol as may be sufficient until globules are no longer visible. The powder is dried immediately by a gentle heat, access of light being excluded, and it is kept in a well stopped vessel.¹

The proto-iodide, according to Thomson, consists of 250 parts of mercury, and 156 parts of iodine. It has a greenish yellow colour, and is a preparation holding the same relation to iodine and mercury, that calomel holds to chlorine and mercury ; it is more volatile, however, than calomel, but like it is almost insoluble in water.

EFFECTS ON THE ECONOMY.

This preparation has been less used than the deuto-ioduret, to be described next. Tünnermann remarks, as the results of his experience, that its action in respect to the mercury, is analogous to that of calomel, except that it appears to excite more the lymphatic and glandular systems. When given in conjunction with a generous animal diet, he found it very efficacious in a case of scrofulosis, where colliquative sweats had appeared ; and in a second case, also, it rendered essential service. In one of the cases, he gave it internally in the dose of from one twelfth to one half a grain three times a day ; in the other of from one half a grain to a grain. He directed it also to be rubbed, in the form of ointment, on the tumefied glands of the neck. Pelletan likewise found it serviceable in the cure of obstinate glandular swellings, when used in the form of ointment in combination with morphine, as well as in cases of obstruction of the liver. Biett recommends an ointment of the protoioduret in the treatment of chronic venereal ulcers, the cicatrization of which it expedites ; Lugol² advises it in phagedænic scrofulous ulcers, which present a syphilitic aspect ; and Poiret³ recommends it strongly in cases of psoriasis ; the patient using at the same time simple alkaline or vapor baths alternately. According to the experience of Ricord,⁴ in the syphilitic affections of children, especially of a cutaneous character, it is to be preferred to other forms of mercurial, and is not apt to be followed by the bad effects, which in adults, often supervene on the use of other preparations.⁵

¹ Brande, Dictionary of Materia Medica, p. 289. Lond. 1839.

² Essays on the effects of Iodine in scrofulous diseases, &c. by Dr. O'Shaughnessy, p. 170. Lond. 1831.

³ Gazette des Hôpitaux, Juillet 20, 1837 ; see, also, Bulletin Général de Thérapeutique, Juillet, 1837.

⁴ La Lancette Française, No. 65., 1834.

⁵ Cogswell's Essay on Iodine, p. 158. Edinb. 1837.

METHOD OF ADMINISTERING.

On account of its insolubility, it is given only in the form of powder or pill, to the extent of from one-twelfth to half a grain, twice or thrice a day. Externally, it is applied, for the same reasons, in the form of ointment only.

Pilulæ Hydrargyri Iodidi.—(Pharmac. Londin.)

Pills of the Iodide of Mercury.

- ℞. Hydrarg. iodidi, ℥j.
 Confect. rosæ caninæ, ℥ijj.
 Zingiberis contritæ, ℥j. M.

Pilulæ Hydrargyri Proto-Iodureti Compositæ.

Compound Pills of Proto-Iodide of Mercury.

- ℞. Hydrarg. proto-iodur. gr. vj.
 Extract. opii, gr. iv.
 Lactucarii, gr. xxiv.
 Ext. guaiac. gr. xlviij.

M. Fiant pilulæ xlviij.

Dose.—For a child, half a year old, one pill; for older children, two, three, or four. In the syphilis of children. RICORD.

- ℞. Hydrarg. proto-iodur. gr. j.
 Ext. junip. gr. xij.
 Pulv. glycyrrhiz. q. s.

Divide in pulv. viij.

Dose.—At first, two, morning and evening; afterwards, three or four. MAGENDIE AND BIETT.

Pulveres Hydrargyri Proto-Iodureti.

Powders of the Proto-Iodide of Mercury.

- ℞. Hydrarg. proto-iodur. gr. i, (iv, vj, vel viij.)
 Magnes. alb. ℥j.

M. Et divide in part. xij.

Dose.—A powder three times a day.

Unguentum Hydrargyri Proto-Iodureti.

Ointment of the Proto-Iodide of Mercury.

- ℞. Hydrarg. proto-iodur. gr. vj.
 Morphin. acetat. gr. viij.
 Adipis, ℥j. M.

In obstinate glandular swellings.

PELLETAN.

℞. Hydrarg. proto-iodur. ʒj.
Adipis, ʒiss.¹ M.

In old venereal ulcers.

MAGENDIE AND BIETT.

℞. Hydrarg. proto-iodur. ʒij. (vel iij, vel iv.)
Adipis, ʒij. M.

As a dressing to phagedænic and scrofulous ulcers. LUGOL.

When this salve is first prepared, it is of a canary yellow, sometimes of a greenish, colour. By time, it becomes of an orange hue, when it must be thrown aside, as, owing to the formation of the deuto-ioduret, it has become as corrosive as the ointment of corrosive sublimate.

℞. Hydrarg. proto-iodureti, ʒj.
Adipis, ʒj. M.

To be rubbed morning and evening on the parts affected.

POIRET.

Unguentum Hydrargyri Iodidi.—(Lond. Pharm.)

Ointment of Iodide of Mercury.

℞. Hydrargyr. ioidid. ʒj.
Ceræ albæ, ʒij.
Adipis, ʒvj. M.

IV. HYDRARGYRI DEUTO-IODURETUM.

SYNONYMES.—Hydrargyrum Iodatum Rubrum, H. Biniodidum, H. Periodatum, Iodidum Hydrargyricum, Deutoiodide of Mercury, Biniodide of Mereury.

French.—Deuto-Iodide de Mercure, Periodure de Mercure.

German.—Rothes Iodquecksilber, Iodquecksilver im Maximum, Quecksilberiodid, Deuto-Iodür des Quecksilbers.

METHOD OF PREPARING.

According to Tünnermann, this beautiful preparation may be obtained by double decomposition, by mixing 137 parts of corrosive sublimate with 165 parts of iodide of potassium, rubbing them together, for a time, in the dry state, and afterwards with water, to dissolve the chloride of potassium formed. To prevent a solution

¹ Tünnermann uses only ʒss.

of the precipitate in this salt, the mixture is put into a glass vessel, and agitated with a considerable quantity of water, until the supernatant liquid appears entirely clear, for which purpose a few minutes suffice. It is now filtered; the residue on the filter well washed, and gradually dried by warm air. By this process, the potassium unites with the chlorine of the mercury, and the mercury with the iodine in the dry way; the water is only useful in removing the chloride of potassium.

The following is the process recommended in the London Pharmacopœia:—An ounce of mercury and ten drams of iodine are to be rubbed together, alcohol being gradually added until the globules are no longer visible. The powder is to be dried with a gentle heat, and kept in a well-stopped vessel.

The deuto-ioduret of mercury is a beautiful vermilion-coloured powder, which, when moderately heated, becomes yellow, but, when exposed to the air, is gradually restored to red, and is volatilised. When volatilised, it crystallises in beautiful rhomboidal leaves, which, at a higher temperature, are of a golden yellow hue; but at the ordinary temperature of a shining red. The deuto-iodide is insoluble in water; but soluble in alcohol and ether. It contains 250 parts of mercury, and 312 of iodine.

EFFECTS ON THE ECONOMY.

This preparation, which was introduced into practice by the French physicians, has been particularly recommended in syphilis complicated with scrofula. Biett found it very efficacious in scrofulo-venereal ulcers, in syphilitic swellings of the lymphatic glands, and in inveterate itch. He administered it also internally, dissolved in alcohol or ether, in scrofulous affections complicated with syphilis, and with advantage. In its effects, it resembles the corrosive sublimate, whilst the proto-ioduret resembles calomel. Rayer,¹ indeed, considers the deuto-iodide more active than the corrosive sublimate. Paillard found it very efficacious in chronic cutaneous eruptions. He dipped a camel's hair pencil in a weak solution of the deuto-ioduret in ether, and penciled the parts with it three or four times a day. In this way, he cured several squamous, tuberculous, and other eruptions, exciting scarcely any pain. As, however, this mode of applying it often failed, he employed 3j

¹ Treatise on Skin Diseases, by Dr. Willis, p. 79. See, also, Puche, *Journal des Connaissances Médicales*, Oct. et Nov. 1838, & Janvier, 1839.

mixed with ℥j of oil of almonds in the same manner. If the corrosive action was considerable, a sense of heat soon arose in the part, which gradually terminated in burning pain. The neighbouring parts were also hot, painful, and tumefied; and, in the course of an hour, an effusion of serum took place; but, in four or five hours, the pain always disappeared. If applied on the cheeks or lips, salivation at times ensued suddenly. Scabs formed, which fell off in a few days, and exposed a red surface, much disposed to cicatrise. When frequently applied, symptoms occurred, which were probably the consequences of its being absorbed, namely; fever, colic, diarrhœa, and dysentery. Breschet¹ applied it, in the form of ointment, with great success, in a case of obstinate ulceration, presumed to be carcinomatous, at the angle of the eye. Blasius recommends it internally and externally in lupus. Tünnermann used it with advantage, in the form of ointment, for the removal of furuncular inflammation of the glands of the neck. Riecke,² likewise, employed it as a discutient, (gr. xvj to ℥j of lard,) in a case of ganglion in the region of the knee—whence violent pain proceeded along the nerves when it was pressed upon—and in two cases of goître, with great success. Whenever it has to be applied over an extensive surface, as in the disease last mentioned, it has generally to be discontinued soon, in consequence of the supervention of inflammation of the cutaneous surface.

In the form of a weak ointment—composed of the deuto-iodide gr. ij, cerate ℥ij, almond oil ℥j—it has been used in opacity of the cornea.³

Recently, Kopp has published some favourable cases of the therapeutic application of the deuto-ioduret. The ointment, given below, he found very efficacious in luxuriant, chronic, scrofulous, and syphilitic sores, as well as in condylomata, and venereal blotches. Not less useful did he find it in many other skin diseases, and particularly in herpes. In one case, in which he administered it in the last affection, he found a coexistent goître, which had been there for several years, almost wholly disappear; and he, consequently, afterwards prescribed it frequently for the latter affection. He also used it, with excellent effect, in ophthalmia tarsi, and, where there was a disposition to the formation of

¹ Lugol's Essays on Iodine, by O'Shaughnessy, p. 204.

² Die neuern Arzneimittel, u. s. w. S. 270.

³ Gräfe und Walther's Journ. für Chirurg. Bd. xiii, cited by Pereira, Elements of Materia Medica, pt. i, p. 493. Lond. 1839.

hordeolum, a little of the second ointment, given hereafter, was applied at bed time to the edges of the eyelids. Lastly, he advises friction with the first ointment in chronic rheumatic pains, and in cases of induration of the glands, especially of the liver. After the friction has been continued for some time, an eruption occasionally appears.

We have frequently administered the deuto-ioduret in public and in private practice, in cases where an active sorbefacient appeared to be needed, and where a combination of remedies so potent as mercury and iodine suggested itself. In chronic glandular enlargements, especially of the liver and spleen, and in habits where the use of mercury was not contra-indicated, both the deuto-ioduret and the proto-ioduret have, in our hands, proved extremely serviceable. Perhaps there are no preparations belonging to the class of sorbefacients, which, under the circumstances in question merit more attention.

MODE OF ADMINISTERING.

The deuto-ioduret of mercury is given internally in the form of powder or pill, or dissolved in alcohol or ether, in the dose of one sixteenth to one fourth of a grain daily. Externally, it is applied in the form of ointment.

Pilulæ Hydrargyri Deuto-Iodureti.

Pills of the Deuto-Ioduret of Mercury.

℞. Hydrarg. deuto-iodur. in syrup. commun.
pau. ill. terendo bene distribuend. gr. v.
Micæ panis alb.
Pulv. sacch. alb. aa. q. s. ut fiant pilulæ lx.

Dose.—Two, morning and evening, drinking afterwards a cupful of oatmeal gruel. The dose to be raised gradually.

BLASIUS.

Tinctura Hydrargyri Deuto-Iodureti.

Tincture of Deuto-Ioduret of Mercury.

℞. Hydrarg. deuto-iodur. ℥j.
Alcohol 36° (.837) ℥iss. M.

Dose.—Ten to twenty drops in a glass of distilled water.

MAGENDIE AND BIETT.

Æther Sulphuricus cum Hydrargyri Deuto-Iodureto.

Sulphuric Ether with Deuto-Ioduret of Mercury.

- ℞. Hydrarg. deuto-iodur. ʒj.
 Æther. sulphur. ʒiss. M.

Administered like the last.

MAGENDIE AND BIETT.

Unguentum Hydrargyri Deuto-Iodureti.

Ointment of Deuto-Ioduret of Mercury.

- ℞. Hydrarg. deuto-iodur. subtiliss. trit. gr. vj.
 Adipis, ʒvj. M.

KOPP.

- ℞. Hydrargyr. deuto-iodur. subtiliss. pulv. gr. $\frac{1}{8}$ to $\frac{1}{4}$.
 Adipis, ʒij.
 Ceræ albæ, gr. ij.

M. fiat unguentum.

For an eye salve.

KOPP.

- ℞. Hydrargyri deuto-iodur. gr. xv.
 Adipis, ʒss.

M. exactissimè. Fiat ung.

As a dressing in lupus.

BLASIUS.

- ℞. Hydrarg. deuto-iodur. gr. xv.
 Adipis, ʒij.
 Ol. bergamot. gtt. x. M.

To be rubbed on the parts in chronic cutaneous affections.

BIETT.

- ℞. Hydrarg. deuto-iodur. ʒj.
 Adipis, ʒiss. M.

To be spread thin on lint in old venereal ulcerations.

BIETT.

INDIGUM.

SYNONYMES—Indicum, Indicus Color, Pigmentum Indicum, Indigo.
German.—Indig.

This well-known colouring material is obtained from several species of the genus *Indigofera*, (*I. tinctoria*, *I. anil*, *I. disperma*, *I. argentea*, and *I. hirsuta*,) belonging to the natural family *Leguminosæ*, and, in the Linnæan system, to the class *Diadelphia*, order *Decandria*. As we receive it, it is in small, solid, brittle masses, of a deep azure colour, without smell or taste, and assuming a coppery lustre on being rubbed. It is entirely soluble in sulphuric acid, and is wholly consumed on burning coals. According to the analysis of Chevreul, 100 parts of the Guatemala indigo of commerce contain only 45 parts of pure indigo, or *indigo-blue*—with which no therapeutical experiments have as yet been made; the greater part of the residue consists of a green matter soluble in spirit of wine, (*indigo-green*;) and a red resin, (*indigo-red*;) the rest is extractive matter, gum, and some carbonate of lime, oxide of iron, argillaceous and siliceous earth. With hydrogen, pure indigo forms isatic acid, which has considerable resemblance to the hydrocyanic.

EFFECTS ON THE ECONOMY.

The natives of the countries where the different kinds of indigo grow, employ it occasionally as a therapeutical agent, especially in diarrhœa and intermittent fever. It is only within the last few years that attention has been paid to it in Europe. Professor Von Stahly,¹ of Ofen, appears to have first employed it with success in various spasmodic diseases, especially in epilepsy. To these cases Lenhossek alludes, in detailing certain trials which he himself had made with it. In 1833, Grossheim² made known a case, in which he found it extremely useful. A lady, twenty-eight years of age, had suffered for eleven years with violent hysterical convulsive attacks, for which she had employed almost every remedial agent. The attacks began with a feeling of heaviness over the whole body, with slight convulsive twitchings of the limbs, which extended to

¹ Hecker's neue Annalen, B. i, H. 1. Berlin, 1835.

² Mediscinische Zeitung, No. 51, 1833.

the trunk, and were followed by total, or almost total, loss of consciousness: this, after an uncertain period, terminated in a comatose state, from which she was gradually restored—but in a languid condition—to perfect consciousness. Under the use of indigo for half a year, with pediluvia, which had been previously employed without advantage, she completely recovered.

These results gave occasion to the institution of experiments, touching the remedial properties of indigo, in the Charité at Berlin, the results of which have been given by Roth.¹ In most of the cases, the indigo excited nausea, and even vomiting, preceded by a metallic taste on the tongue. At times, the vomiting was so violent and prolonged, that it was necessary to discontinue it; but generally, on continuing the use of the indigo, the vomiting ceased in three or four days, and diarrhœa took its place. All the patients did not vomit, and many escaped the diarrhœa. When once diarrhœa occurred, however, it commonly persisted so long as the indigo was used. The evacuations were seldom entirely fluid, but usually semifluid, and of a dark bluish-black colour. While the vomiting and purging continued, more or less uneasiness was experienced in the digestive apparatus. The vomiting and diarrhœa were frequently accompanied by pains in the stomach and bowels, which were commonly mild, but occasionally so violent that the indigo had to be discontinued. In every patient at the Charité, the urine was of a dark violet hue. Stahly affirmed, that the perspiration was coloured blue, but this Roth never observed. He remarked, moreover, that after the use of indigo for several weeks, certain patients were easily thrown into slight convulsions, similar to those caused by the use of the nitrate of strychnine, and that they were affected with slight subsultus tendinum. Almost all the patients, indeed, who took indigo, were at first more frequently attacked with spasms than prior to the use of the remedy. In the beginning, the attacks of the disease were, in all cases, stronger, but of less duration, than previous to its employment. These changes continued for one, two, three, and even as long as eight weeks, whether the patients took small or large doses of indigo. At the expiration of this time, all the epileptic symptoms were diminished in intensity and duration, until the last attacks were mere premonitions.

The number of epileptic cases, treated by indigo, which Roth had an opportunity of observing in the Charité, was twenty-six; of

¹ Hecker's neue Annalen, B. i, Heft. 1. Berlin, 1835.

these, nine were cured, eleven improved, and six remained uncured.

Dr. Ideler,¹ who instituted the experiments at the Charité, has also given publicity to the results; and his testimony accords with that of Roth. It is proper to observe, however, that of the nine cases cured, three experienced relapses in from eight to twelve months; but from causes, according to Riecke,² which, of themselves, might have induced epilepsy.

Dr. Strahl,³ of Berlin, likewise experimented with the indigo, but his results were by no means favourable. In ten cases of old standing epilepsy, the indigo was not of the slightest service, and the same may be said of two cases of St. Vitus's dance. In four cases of hysteria, it excited violent nephralgia, and in one of the cases only, after the affection of the kidney was removed, was the patient cured. The indigo acted, however, signally on the uterus; in two cases of spasmodic affections complicated with amenorrhœa, the latter derangement was removed, whilst the spasms, even after the recurrence of the catamenia, still continued. In the Charité of Berlin, the purest Guatemala indigo of commerce was used, and it may be a question, whether Strahl did not employ one of feebler powers. It is worthy of remark, that he observed a dark green colour of the urine during its use, whilst in the cases in the Charité, a dark violet hue was constantly noticed.

Favourable cases are also detailed by Drs. Mankiewicz, of Nackel,⁴ and Hohnhorst, of Frankfort.⁵

Dr. Noble, of Versailles,⁶ administered it in three cases, in which the disease had continued for four, twelve, and twenty years respectively. At the time of making known the results, a month had elapsed in the first case, and two months in the second, since an attack had been experienced, and the last case he considered entirely cured. In the first patient, who was eighteen years old, four drams occasioned vertigo, slight depravation of vision, and convulsions similar to those produced by strychnine; and in both the other cases, diarrhœa was induced, which ceased, however, as soon as the indigo was discontinued or the dose reduced one half. He

¹ *Medicinische Zeitung*, No. vi. and *Lancet*, June 6, 1835.

² *Op. cit.* S. 276.

³ Hecker's *Neue wissenschaftliche Annalen*, 1836; and *Edinb. Med. and Surg. Journal*, 1837.

⁴ *Medicin. Zeitung*. Mai 31, 1837, S. 109.

⁵ *Ibid.* S. 110.

⁶ *Bulletin Général de Thérapeutique*, 1836.

gave it in the dose of one dram gradually increased to four drams daily.

The observations of Rech, of Montpellier, were not as favourable to the indigo. In none of the epileptics to whom he gave it was there any thing more than a slight amelioration. In the Hospice d'Hommes Incurables du Faubourg St. Martin, trials were also made with it by Dr. Blanche. Of ten cases five were either cured or improved. One of these had existed for three years, and the paroxysms recurred every five or six days; but after the administration of the indigo, he had no return at the expiration of five months; in a second case, a youth fifteen years old—who had been epileptic from birth, and had regularly one or two paroxysms a day, from the 19th of July, when the exhibition of the indigo was begun with, until the middle of August, when the results were published—had only two insignificant attacks. The improvement in the other three cases was not as marked, yet it was unquestionable. The other five children experienced no improvement, yet no inconvenience was sustained, although the indigo was given in doses of four, six, and eight drams in the day. It was administered in water or in a tisane; and in one or two cases it excited vomiting, but after having been discontinued, it was borne subsequently. In all it induced tormina, and acted upon the bowels, but did not interfere with the appetite or any of the other functions.

Very recently, Dr. Benjamin F. Hardy,¹ one of the senior resident physicians at the Philadelphia Hospital, has published the results of some trials made with the indigo, which, so far as they go, confirm its antiparoxysmal power. Two of the seven cases reported were apparently cured, two ameliorated, and three without any decisive results—the medicine not having been continued perhaps for a sufficient length of time. In these cases, the indigo was commenced in the dose of $\mathfrak{zj}$, which was usually doubled daily until the patient took $\mathfrak{z}ij\frac{1}{4}$ daily, which quantity was persevered in for some weeks. In some of the cases the fæces, urine, and perspiration were all coloured blue.

In other trials, instituted in the same excellent charity, with the indigo, the results were not as favourable. It is obvious indeed, that a wide difference must exist amongst cases of epilepsy, and that where the organic modifications are considerable, as indicated by concomitant mania or idiocy, but little can be expected from any remedy; but even in such hopeless cases, the number of

¹ American Medical Intelligencer, for July 15, 1839, p. 122.

paroxysms appears to have diminished under its use. Where the cerebral affection is slight and more functional than organic, the indigo, like the artemisia and other remedies extolled in epilepsy, may be useful. Its main efficacy, perhaps—as we have said of the *Ferrum Carbonatum Præcipitatum* (p. 208)—consists in the new impression which it makes, in adequate doses, upon the nerves of the stomach, and through them upon those of the whole system; but to effect the revulsion to the proper extent, it is necessary that the dose should be augmented day by day, and the remedy be continued in large doses for a sufficient length of time.

MODE OF ADMINISTERING.

As the indigo is extremely light, the powder is too bulky for administration; it is taken with disgust, and is apt to excite vomiting. On this account, the form of electuary was selected in the *Charité*. It was generally combined with the *pulvis aromaticus*, or the *pulvis Doveri*. As to the dose, Roth advises, that it should be commenced in grains but be elevated to drams, nay even to one or more ounces in the day. In the *Charité* the following formulæ were generally employed:—

Pulvis Indigi.

Powder of Indigo.

- ℞. Indig. subtilissim. pulver. ℥ss.
Pulv. aromat. gr. v. M. et fiat pulvis.

A powder to be given four times a day.

Electuarium Indigi.

Electuary of Indigo.

- ℞. Indig. pulv. aquæ guttis nonnullis subact. ℥ss.
Pulv. aromat. ℥ss.
Syr. simpl. ℥j.

M. et fiat electuarium.

To be used in the course of the day.

IDELER.

IODINUM.

SYNONYMES.—Iodinium, Iodium, Iodum, Iodina, Iodine.

French.—Iode.

German.—Iod.

Iodine was accidentally discovered, in the year 1812, by Courtois, a manufacturer of saltpetre at Paris, but it was chiefly through the labours of Gay-Lussac and Sir Humphry Davy,¹ that the chemical relations of this elementary body were appreciated. The discoverer first detected it in the mother waters of soda obtained from sea-weed; and as it was found to exist chiefly in several of the sea-weeds, and especially in the sponges, it struck Coindet,² that experiments might be made with it in goître; from these he obtained such valuable results that its reputation soon spread abroad, and it was employed in various other diseases,—often with the most marked advantage.

By experience, too, the injurious effects which it is generally considered capable of inducing were appreciated, so that it could be administered more satisfactorily than at an earlier period.

By the continued investigations of the chemist, iodine was found to be more largely distributed than was at first imagined. It was discovered in many of the marine mollusca, in sea-water, and in several mineral waters.

METHOD OF PREPARING.

Iodine is obtained from the mother waters of the soda derived from sea-plants, in which it exists in the form of hydriodate of potassa. The waters are procured by burning different kinds of weeds which grow on the sea-shore, lixiviating the ashes, and concentrating the liquor. To obtain the iodine from this liquor, an excess of concentrated sulphuric acid is added to it, and the whole is boiled gently in a glass retort furnished with a receiver. The sulphuric acid lays hold of the basis of the hydriodic salt, and of the hydrogen of the hydriodic acid; whence result sulphate of potassa, water, sulphurous acid and iodine; the last passing over into the

¹ *Annales de Chimie*, lxxxviii. xc. and tom. xci. and *Philos. Transact.* 1814 and 1815.

² *Bibliothèque Universelle*, Juillet, 1820, p. 190.

receiver in violet fumes with a little acid, and there becoming condensed. To purify the iodine, it may be washed with water, containing a little potassa, and be redistilled.¹

Iodine is solid at the ordinary temperature, of a foliated appearance, metallic lustre; of a grayish black colour similar to that of plumbago, and friable. Its taste is hot, notwithstanding its sparing solubility in water. It is soluble in 7000 parts of that fluid, and the solution has an orange yellow colour. Its specific gravity is 4.946 at 62° of Fahrenheit. Its smell is similar to that of chlorine, with which it accords in its property of destroying vegetable colours. It possesses, in a high degree, electro-negative properties. It colours the skin yellow, which colour gradually disappears. It fuses at 220° Fahrenheit. The vapour is of a beautiful violet colour, whence its name (*ἰώδης*, 'blue'). It is soluble in ether and in alcohol; forms an acid both with oxygen and hydrogen, and enters into numerous chemical combinations.²

EFFECTS ON THE ECONOMY IN HEALTH.

Soon after the discovery of iodine, and the accurate investigations of Gay-Lussac, Magendie³ instituted a series of experiments in order to appreciate its action on the animal organism. It was injected into the veins without any apparent effect. Several dogs were made to swallow it; they vomited, but it exerted no farther effect. He himself swallowed a coffee-spoonful of the tincture, and perceived no other result than a disagreeable taste, which continued for several hours, but gradually disappeared. In larger doses, however, the effects were markedly injurious. Orfila⁴ likewise instituted several experiments on dogs, from which he concludes:—that iodine, introduced into the stomach in moderate quantity, acts as a gentle stimulant, but may excite vomiting:—that in the dose of a dram, it almost always killed the animal in four or five days, when the œsophagus had been tied to prevent vomiting, and that in the part of the mucous membrane with which it came in contact, ulcers were gradually formed:—that when administered in the dose of from two to three drams, when the œsophagus was not tied, it

¹ For the method employed by Soubeiran, see *Journal de Pharmacie*, Janvier, 1837; and for that by Barruel, see Bussy, *Ibid*.

² See, on Iodine and its combinations, Mr. Duhamel, in *Philad. Journal of Pharmacy*, vi. 101. Philad. 1823-4.

³ *Formulaire pour la préparation, &c. de plusieurs nouveaux Médicaments*.

⁴ *Toxicologie*, i. 556.

excited vomiting for several hours, even when a part of the poison had been evacuated by the bowels;—that it seldom caused death when given in the dose of one or two drams, the animal rejecting it by repeated vomiting; that it does not destroy life when applied externally, and that it must be classed amongst the irritant poisons. Dr. Cogswell,¹ in repeating one of Orfila's experiments, in which seventy-two grains of iodine were introduced into a wound on the back of a dog without much effect on the health of the animal, did not attain exactly the same results. He introduced a scruple of iodine into the cellular tissue of the thigh of an adult rabbit, through a small opening made in the skin. The animal manifested no symptom of pain, and was able to make use of the limb as freely as before the operation, but, in the course of a fortnight, it gradually lost flesh, exhibiting an emaciated look, and the hair dropped off from many parts of the head. At the end of this time, thick adhesive pus was found distending the cavity of the wound, from which the iodine had entirely disappeared. Dr. Cogswell properly suggests, however, the possibility, that the irritation of a large abscess might have been the sole origin of the animal's unhealthy appearance.

To discover the effects, which it induces on man, Orfila took two grains fasting. An extremely disagreeable taste, with some nausea, was the only consequence. On the next day, early, he took four grains, when he immediately experienced a sense of constriction and heat in the throat, which continued for a quarter of an hour; soon afterwards he vomited a liquid yellowish matter, in which iodine was easily perceptible. Except a slight degree of oppression felt during the day, he observed no change in any of the functions. On the second day thereafter, he took six grains fasting, after which, he soon experienced a sense of heat, constriction of the throat, nausea, eructation, increased flow of saliva, and pain at the pit of the stomach; ten minutes afterwards, he was attacked with copious bilious vomiting, and slight colic pains, which continued for an hour, and were removed by two emollient glysters. The pulse which, prior to the experiments, beat sixty times in the minute, became more frequent, beating from eighty-three to ninety, and was much stronger. The breathing was tolerably free; but from time to time, there appeared to be a great obstacle to the dilatation of the chest on inspiration. The urine was higher

¹ Experimental Essay on Iodine and its compounds. By C. Cogswell, A. B., M. D. p. 21. Edinb. 1837.

coloured. All the symptoms were removed by the copious use of gum water as drink, and of emollient glysters.

Dr. Gully says, that he has given as much as three drams of the tincture daily, and did not observe any effect. Dr. Kennedy,¹ of Glasgow, exhibited, within eighty days, nine hundred and fifty-three grains of iodine in the form of tincture, the doses having been so proportioned, that, towards the last, the patient—a girl—did not seem to be in any way particularly affected.

Dr. Buchanan² has given half an ounce of the iodide of potassium within twelve hours, without any unpleasant result, provided diluents were largely taken at the same time. It has been conceived, that where iodine proves mischievous, it is owing to its being in a free state, and that it then operates as a corrosive poison. The tincture of iodine, and the ioduretted hydriodates, are esteemed to be objectionable on this account.³

From experiments, instituted by Jörg⁴ on himself and on other healthy individuals, it appeared to him, that iodine, first of all, acts as a stimulant on the intestinal canal; soon afterwards, it excites, also, the different glands in the cavity of the mouth and stomach, the pancreas, the liver, and even the urinary and genital organs. An afflux of blood to the respiratory organs likewise ensues, which extends even as far as the Schneiderian membrane. There is no doubt whatever that the iodine enters into the blood, and, in this way, doubtless produces its modifications on the system of nutrition. Two drams, according to Dr. Buchanan,⁵ were given to a young man labouring under gonorrhœa, and, as soon as the medicine made its appearance in the urine, blood was drawn from the arm. On examining it, both the serum and the crassamentum were found deeply impregnated with iodine. The same dose was given to a boy affected with dropsy of the knee-joint. About five hours after the dose had been taken, a very small puncture was made into the joint, and upwards of twelve ounces of synovia were drawn off by a cupping-glass. The synovia contained iodine in abundance. To an old man, who had a very large hydrocele, two drams of iodide of potassium were given over night, and the same quantity the following morning: on tapping him some hours after

¹ Lond. Med. Repository for 1822.

² Lond. Med. Gazette, July, 1836. See, also, Fuster, in *Bullet. Général de Thérap.* Fév. 1837, & Sep. 1837.

³ Brande's Dictionary of the *Materia Medica*, p. 323. Lond. 1839.

⁴ *Materialen zu einer künft. Heilmittellehre*, u. s. w. i. 473. 1824.

⁵ *Op. cit.*

he had taken the last dose, more than thirty ounces of serum were drawn off, containing a large quantity of iodine.¹

Dr. Gairdner² observed the action of iodine on the human body when administered in particular doses, and pointed out the disadvantages attendant upon an improvident use of the article. The most striking inconveniences were induced in the digestive organs: it excited diarrhœa, and, at times, obstinate constipation; gastrodynia and violent vomiting, especially when food was received into the stomach.

The emaciation occasioned by it, is, according to some, a striking phenomenon; and may attain an incredible extent; yet it is proper to remark, that Lugol,³ in his frequent employment of iodine in scrofula, never observed this result: he affirms, indeed, that emaciated patients became stronger under its use; that the stout did not grow leaner, and that they who held the medium position, in these respects, acquired strength under its employment,—results which have been confirmed by others, and which would, therefore, seem to show that this, as well as some of the other unpleasant effects ascribed to iodine, may have been owing to an incautious use of the article.

In addition to the above effects, Gairdner noticed anxiety, depression of spirits, and other symptoms similar to those of hypochondriasis; obscurity of vision; hardness of hearing; palpitations; and tremors of the limbs, particularly of the hands, which last symptom indicated the full effect of iodine on the constitution. Dr. Gairdner found, however, that the remedy was extremely variable in its effects; and that it might frequently be given in large doses, for a long time, without disadvantage, whilst, at other times, the unpleasant symptoms supervened rapidly; indicating that much must depend upon the peculiar impressibility of the individual.

Coindet,⁴ who, as we have remarked, first used the iodine as a therapeutical agent, speaks of many of the above-mentioned phenomena as resulting from the administration of iodine; these he considers evidences of the saturation of the organism, as the effect

¹ Brande, *Op. citat.* p. 321, Lond. 1839. See, also, M. Cantu, in *Journal de Chimie Médicale*, ii. 291 & 394; and Bennesscheidt, *Ibid.* iv. 383.

² *Essay on the Effects of Iodine, &c.* Lond. 1824.

³ *Mémoire sur l'emploi de l'Iode dans les Maladies scrofuleuses.* [Paris, 1829; and *Observations on the Effects of Iodine*, p. 17, Johnson's translation. Lond. 1824.

⁴ *Bibliothèque universelle*, Mars, Avril, Mai, et Septembre, 1821.

on the mouth is an index of the same thing in the case of mercury. It appears, however, to be never necessary, in the administration of iodine, to induce a saturation of the organism in order that the full sanative influence of the remedy shall be elicited. On the contrary, it seems to be advisable to avoid such saturation; and, accordingly, whenever there are the slightest indications of it, the dose of the iodine should be diminished, or it should be discontinued for a time; after which—according to the results of numerous cases—its curative agency, when it is resumed, is exerted afresh, and more decidedly. Several physicians, indeed, advise that frequent intermissions should be made in the use of the agent, in order that its action may be more certain.

According to the observations of Coindet and Formey, iodine, when administered internally, occasions increase of appetite; but no influence is perceptible on the condition of the bowels and urinary organs; or on the perspiratory apparatus. On the other hand, when breathed for a few instants, the vapours of iodine twice caused in M. Chevallier¹ violent colic, which readily yielded to gum water and laudanum. Raspail, however, under analogous circumstances, experienced no other inconvenience than a disagreeable taste in the back part of the mouth. According to Lugol, the vapour disengaged from tincture of iodine poured into the water of a bath, is liable to induce a state of "iodic intoxication," and even of cerebral congestion. He affirms, that it exerted a powerful diuretic influence on all his patients, the urinary secretion being so much augmented, that many of them, contrary to their usual habit, were compelled to rise from bed several times in the night to discharge their urine. In upwards of a third it had a cathartic effect, producing six or seven evacuations in the day, and occasionally tormina. In several, pyalism ensued. Others, and especially females, complained of gastrodynia, which was always removed by the wine of cinchona, of which two or three ounces were taken shortly after the iodine.

Dr. Manson,² who used the tincture of iodine, occasionally found it produce sickness of stomach, and Mr. Delisser affirms, that, in two months, he gave one thousand and nineteen grains of iodine to a female affected with cancer of the mamma,—the doses, at certain periods, amounting to thirty grains in the twenty-four hours. The consequences were anorexia, quick pulse, ulceration of the

¹ Journ. Général de Méd. ciii. 336.

² Medical Researches on the Effects of Iodine. Lond. 1825.

mouth, and fœtor of the breath, of a different kind, however, from that which arises from mercury.

It would appear, that the effects of the remedy vary according to the form in which it is administered, and it is proper to observe, in viewing the different results obtained by Lugol and Coindet, that the latter commonly gave the tincture of iodine, whilst the former prescribed the solution in water, with a little muriate of soda. Lugol also observes, that the appetite of his patients was very much increased by it. Eager, who likewise administered the watery solution, but rarely observed diarrhœa and emaciation; and, in general, indeed, the appetite and nutrition improved under it. At times, ulceration took place in the mouth, whereby the breath assumed a mercurial fœtor, and salivation has been observed from it, according to Manson,¹ Winslow,² Ely,³ Mackall,⁴ and others; but Riecke⁵ suggests, that this, perhaps, only occurred in those, who, along with the use of iodine internally, had employed the ioduret of mercury externally. On the genital organs, Eager found it to act as an excitant; it augmented the activity of the uterus, and rendered the catamenia more abundant. It is asserted, too, to have increased the sexual appetite, but this is questionable; during its use, indeed, the testes in men, and the mammæ in women, have been observed to disappear;⁶ but this, as we shall see, is certainly not a common occurrence.⁷ On the other hand, it has been imagined to cause sterility. Two cases are detailed by Dr. Robert H. Rivers,⁸ in which barrenness succeeded to its administration. Magendie, on giving it as an emmenagogue to a young lady of unsuspected virtue, brought on abortion.⁹

Krimer several times observed, even when the tincture was given in small doses, considerable metrorrhagia, epistaxis, hæmoptysis, obstinate diarrhœa, leucorrhœa, &c. supervene under its

¹ Op. citat. p. 61.

² Lond. Med. Gaz. for 1836, p. 401.

³ Ibid. p. 480.

⁴ Medico-Chirurg. Review, Jan. 1836.

⁵ Die neuern Arzneimittel, u. s. w. S. 282.

⁶ Christison, Treatise on Poisons, p. 180; Cogswell on Iodine, p. 47; Edinb. 1837.

⁷ Pereira, in Lond. Med. Gaz. vol. xvii; and Dict. de Mat. Méd., par Mérat & De Lens, Art. Iode.

⁸ American Journal of the Medical Sciences, Aug. 1831, p. 546.

⁹ Formulary, Gully's edit. p. 105.

use. Cases of suppression of the hemorrhoidal flux are asserted to have been restored by it.¹

Jahn² found, in the bodies of two persons, who had long made use of iodine, wasting of the fat; softness and laxity of all the organs and tissues; diminution and disappearance of the glands, and glandiform bodies,—the mesenteric glands; suprarenal capsules, &c.,—and the cellular tissue appeared to exist in smaller quantity. In the case of a female, who died from the excessive use of the tincture, Zinck³ found the bowels inflated with gas; in some parts highly inflamed; in others, exhibiting an approach to sphacelation, both within and without: the inner membrane of the stomach displayed redness, growing deeper from the cardiac towards the pyloric orifice, where the organ looked as if it had undergone corrosion; the liver was large and reddened; and there was ecchymosis of the spleen. Dr. Christison⁴ is of opinion that iodine is capable of inflaming the latter organ.

From the testimony of many observers, it can scarcely be doubted that the iodine disease, or iodosis, or iodism, as it has been termed, may become dangerous to life: generally, however, it is not really so much so as it appears, and is considered to be, and the evil consequences may be readily avoided by proper foresight. Cases, however, have occurred, in which its use has been followed by fatal results;⁵ hence the necessity of circumspection in the employment of so energetic a therapeutical agent.

To avoid evil consequences, Wutzer advises that the iodine should be immediately discontinued, whenever a feeling of increased heat in the pharynx and stomach is experienced immediately after it is taken; but as this evidence cannot be available in small children, attention should be paid, whether, after the medicine has been taken, the temperature of the skin becomes more elevated; the pulse quicker, and whether there is any evidence of pain when pressure is made on the epigastric region. He, moreover, advises, that it should not be given internally to children at the breast.

It has been affirmed, that if the iodine be combined with small

¹ See Ashwell, in Guy's Hospital Reports, vol. i.; and Cogswell, *Op. cit.* p. 43.

² *Archiv. für medicin. Erfahrung*, i, 342, 1829; and *Journal Complément. du Dict. des Sciences Médicales*, xxxv. 362.

³ *Journ. Complém. du Dict. des Sciences Médicales*, xviii. 231.

⁴ *Treatise on Poisons*.

⁵ Sir B. Brodie, *Lancet*, Mar. 30, 1839.

doses of opium, all the disadvantages, immediate and remote, may be avoided; and it is always more advisable to give it in small doses for a longer, than in very large for a shorter, period. At times, it will happen, that in chronic affections—in which it is chiefly used—its beneficial agency may not be decidedly manifested until after the lapse of four or five months; and it is important to bear this in mind, as both practitioner and patient are apt to become dissatisfied, unless the remedy exhibits its action more speedily. When the iodine acts beneficially, the appetite is augmented, or is not deteriorated; digestion improves, so that the patient is able to take more food, and experiences less inconvenience therefrom: the secretion of the bile is increased, and the evacuations are more copious, and of a yellower hue; the peristaltic action goes on more energetically, and the patient gains strength. Such, at least, are the signs that are considered by many to indicate that the iodine agrees; but the absence of all disagreeable consequences is a sufficient index.

To remove the symptoms of iodine disease, or iodosis, (*iodkrankheit*,) general or local bloodletting has been employed; with warm bathing, the use of milk, emulsions of gum arabic, and the like, with rigid diet and rest. The preparations of hydrocyanic acid have also been given with advantage in the palpitation, tremours, and other nervous symptoms that sometimes follow the use of iodine.

Precaution is requisite in the case of impressible, and also—it has been conceived—in robust persons,¹ for fear of the supervention of hyperæmia. It is advisable, too, during its administration, to let the diet be sparing, and devoid of all heating qualities. Kolley² remarks, that iodine occasionally exerts a most unfavourable influence on the nervous system, so that in those, who are easily excitable, unusual pains may be brought on by the use of even three or four drops of the tincture;—these pains, at times, ending in violent spasms. Such persons exhibit the impressibility, even under very minute doses, by fidgetiness or restlessness of the limbs, so that they can scarcely be kept quiet: after a time, numbness and heaviness in all the limbs: heaviness of the head, and a species of inebriation³ succeed, with violent cephalalgia, spasms, tremours of

¹ Riecke, *Op. cit.* S. 284.

² *Journal Complémentaire*, xvii. 307.

³ Giddiness was observed by Dr. Manson, (*Researches on the Effects of Iodine*, p. 61, Lond. 1825;) Ashwell, (*Guy's Hospital Reports*, i. 136;) and

the limbs, paralysis,¹ prostration, spasms, depravation of vision, and disposition to lamentation and distress. Some of these nervous symptoms we have occasionally noticed, when the dose of iodine has been rapidly augmented. Where the person is liable to gastric uneasiness, caution is requisite in the use of the remedy, as it not unfrequently occasions dyspepsia and violent gastrodynia. All febrile and purely inflammatory diseases, according to Kolley, forbid its use.

Of late, Dr. Andrew Buchanan² affirms, that he has never witnessed any of the unpleasant symptoms that have been ascribed to the iodine. He asserts, that he has never seen its use "followed by wasting of the testicles or mammæ, by palpitations, faintness, excessive debility, hurried, anxious breathing, dinginess of the surface, copious clammy sweats, increased menstrual discharge, or an oily appearance of the urine, which are enumerated amongst the symptoms characterising the supposed affection, termed iodism." As regards the wasting of the mammæ and testicles, Mr. Pereira suspects it to be very rare. He has seen iodine administered, he remarks, in some hundreds of cases, and never met with one in which atrophy of either organ occurred. Magendie, also, remarks, that he has never witnessed these effects, although they are said to be frequent in Switzerland.³ Our own experience accords with that of those gentlemen. We have prescribed, and seen it prescribed, largely, both in public and in private; yet no such results have ever supervened. In the Philadelphia Almshouse, great attention was paid to the condition of the testes, in several cases in which it was administered, yet no clear case of atrophy occurred.⁴

EFFECTS ON THE ECONOMY IN DISEASE.

Iodine exhibits itself as a most efficacious remedy in a variety of diseases, in which it is desirable to augment the activity of the absorbent system. In referring to its use in the following diseases, the remarks apply not only to the pure iodine, but to the hydriod-

Lugol, (*Essays on the Effects of Iodine in Scrofulous Diseases*, O'Shaughnessy's translation, p. 73, Lond. 1831.)

¹ Sir B. Brodie, *Lancet*, 1832; Manson, *Op. citat.*; and Sir A. Cooper, *Lancet*, ii. 147.

² *Lond. Med. Gaz.* July 2, 1836.

³ Pereira, *Elements of Materia Medica*, pt. i. p. 114. Lond. 1839.

⁴ Dr. A. M. Vedder, in *American Medical Intelligencer*, for Sept. 1, 1838.

dates of the alkalies, especially the hydriodate of potassa; the medical properties of which accord with those of iodine.

Bronchocele.—The very first experiments made with iodine were on goître. Coindet recommended it strongly in that affection, and Formey¹ first introduced it into Germany. Coindet gave, in the first instance, the tincture internally, and he remarked, that about a week after the commencement of its use, the skin over the goître generally became less tense, the substance of the tumour felt softer, without the tumefaction having abated; the particular portions of the gland became more distinct, separated from each other, and less and less hard, until gradually a diminution was perceptible. Frequently the goître disappeared completely, in the space of from six to ten weeks, under the continued use of the remedy. At an after period, he employed the iodine externally, in which form of administration, the evil consequences, sometimes induced by it, are less to be apprehended; and often its internal and external administration were combined.

The efficacy of iodine in bronchocele, has received the most ample confirmation. Cases have been published by Hufeland, Gräfe, Baup, Helling, Ziegler, Vollmer, Reiss, Paulitsky, Hirsch, Ulrich, Jäger, Barchewitz, Meissner, Vogel, Wutzer, Seiler, Ficinus, Nieu-städt, Hoffmann, De Carro, J. Reid, Manson, Elliotson, Lugol, and numerous others.² We have administered it in fifteen cases of soft goître, and in every one the disease was removed. In two of the cases, it recurred, but the hypertrophy was again dispersed under the use of the remedy.

It has been recommended by some, that its exhibition should be preceded by a bleeding; and as the abstraction of blood facilitates absorption, this may be advisable, especially where but little, if any, effect seems to be induced by it, after it has been administered for some time. Reid advises, that we should commence with its external administration; and, at a later period, conjoin with it the internal.

Although cases have been published, in which iodine has not answered the purpose of the prescriber, there can be no question, that it is the most efficacious agent in goître that we possess; but when the tumour has acquired a cartilaginous hardness, although it may be diminished under the use of the remedy, it can

¹ Bemerk. über den Kropf, u. s. w. Berlin, 1820; and Hufeland's Journal, B. li. St. 4, S. 91.

² Richter's Specielle Therapie. Berlin, 1828, S. 214; and Dictionnaire de Matière Médicale, &c. par MM. Méral & De Lens, Art. Iode.

rarely, or never, be wholly removed. Under such circumstances, however, every other remedy would be found equally fruitless.

Glandular affections.—Besides the affections of the thyroid gland, there are others of different glandular bodies, in which iodine exhibits itself efficacious. Jahn used friction with it in induration of the liver, with advantage. Wutzer gave it in two cases of induration of the spleen, but no precise deductions could be made as to its individual efficacy, owing to its having been combined with other remedies. Milligan relates three cases of enlargement of the liver or spleen in children in which he gave the tincture with success, after mercurials had been used ineffectually. M. Eusèbe de Salle¹ and Jahn employed it with success in enlargement of the testes; Riecke,² too, found it of essential service in a case of great induration and enlargement of the testicle, which in the opinion of several physicians would require an operation. Jahn found it useful in a case of strumous induration of the sub-maxillary gland, and in one of tumefaction of the prostate, the consequence of mismanaged gonorrhœa. Krimer employed it beneficially in cases of tumefaction and induration of the mesenteric glands; and Cerchari³ found an ointment, composed of a scruple of iodine and an ounce of unguentum rosatum, very efficacious in the cure of enlarged tonsils. He applies it to the tonsils morning and evening, by means of a small brush; and he asserts that under its use the tonsils will in two months be restored to their natural dimensions. Any inflammation must be subdued before the ointment is had recourse to.

Sir B. Brodie⁴ has used it successfully in similar cases; the enlarged tonsils being touched every day with a camel's hair pencil dipped in the tincture.

Of its administration in other glandular affections, mention will be made presently.

Scrofula.—Soon after the introduction of iodine into the materia medica, it was used externally in scrofulous affections; and at an early period was prescribed by Gordon, Sir A. Halliday,⁵ and others, in such diseases, especially when combined with mercury. Their observations were confirmed by Magendie, Baup,⁶ Sablairoles,

¹ Journal Complément. xix. 193, and Journal Universel, xi. 346.

² Die neuern Arzneimittel, u. s. w. S. 286.

³ American Journal of Pharm. 2d series ii. 83. Philad. 1837.

⁴ Lancet, Mar. 30, 1839, p. 38.

⁵ Lond. Med. Repos. Sept. 1821.

⁶ Bibliothèque Universelle, Dec. 1821.

Baron, Brera, Manson, and others. Wutzer used it in many cases of scrofula, and found it especially useful in the lymphatic (pastösen) form. In irritable cases, he was cautious of employing it as well as in hyperæmic conditions; and he found that when aggravation of the symptoms occurred, some concealed inflammatory disposition was the cause. More recently, Lugol¹ has contributed to the more extensive employment of iodine in scrofula, and has especially recommended the watery solution of iodine internally, and baths of iodine externally. The fortunate results of his trials, in the Hôpital St. Louis, were corroborated by a committee appointed for the purpose, by the Royal Academy of Sciences. It afforded eminent service in the different forms of scrofula; but in scrofulous caries it merely induced improvement, never entire cicatrisation. Lugol regards iodine as the most efficacious remedy we possess in scrofula. Eager, in speaking of Lugol's method of managing scrofula, properly lays great stress on the accompanying regimen—nutritious diet, cleanliness, bathing and exercise in the open air—which he regards as indispensable to a fortunate issue. He prefers the watery solution of iodine internally to all other remedies. Lugol and Eager unite, with the internal use of iodine, the external, in the form of ointment or solution; for example in fistulæ they employ it as an injection. To excite ulcers to cicatrisation, after appropriate pressure and injections have failed, Eager recommends that the skin, which has separated, at the margins of the ulcers, from the subjacent parts, should be destroyed by caustic or removed by the knife, but that this should not be practised until the scrofulous tendency has been somewhat got under. As a caustic, Eager recommends, pulv. calcis viv. 3vj; potass. caustic. 3v, to be made into a paste with spirit of wine, and to be applied a few lines thick; the skin will be destroyed in about five minutes. According to the same observer, iodine has exhibited its efficacy in various cases of periostitis, scrofulous swellings of the joints, and necrosis. In scrofulous ophthalmia, it was less beneficial. In scrofulous discharges from the nose and ear, iodine injections were commonly of service. Baudelocque² likewise extols the preparations of iodine in scrofula; but in scrofulous affections of the bones, and especially in caries, as well as in scrofulous diseases of the skin, it appeared to him to be inefficacious. Many cases have been related by

¹ Essay on the Effects of Iodine, &c. p. 48.

² Etudes sur la Maladie Scrophuleuse. Paris, 1834; and London Lancet, May 25, 1839, p. 350; see, also, Cogswell on Iodine, p. 75.

Zinck, Maunoir, Manson, Weihe, Benaben, Bayle, and others, in which white swellings of the joints, of a scrofulous character, have been removed by its use. Wutzer has likewise offered favourable testimony in regard to it in affections of the bones, some of which were of a strumous nature. In several cases, so much disorganisation had occurred, that the loss of the whole limb was to be apprehended, yet the iodine arrested the destructive process, and the limbs were preserved. In various scrofulous affections, the tincture of iodine was given by Dr. Kühne¹ with great success, and without any evil consequences. He made it, however, of half the usual strength, beginning with three drops, and gradually increasing the dose to fifteen. In tumefaction of the joints, the iodine, administered externally, has afforded essential service. Wutzer was of opinion, that the tincture of iodine might frequently be applied externally with greater advantage than the ointment; the alcohol readily evaporating and leaving the iodine on the skin; for which reason he recommends that the tincture should be applied repeatedly by means of a camel's hair pencil.

Tubercles.—The efficacy of iodine in scrofulous affections gave rise to the belief, that it might be serviceable in tubercles. Brera and Calloway administered it frequently in mesenteric tubercles with great success, and the observations of Krimer, referred to above, correspond with theirs. It has also been given with advantage in cases of pulmonary tubercles. It was suggested, in such affections, by Dr. Baron, and a case is related by Mr. Haden of apparent tubercles in which it was markedly useful;² similar examples are detailed by Jahn, Waldack, and others; and Berton affirms, that he has found inhalations of the vapour of iodine of decided efficacy in confirmed phthisis, as well as in certain forms of catarrh.

It has likewise been advised *in the form of vapour* by Sir James Murray,³ and by Sir C. Scudamore⁴ in *phthisical affections*. The addition of a little tincture of conium was found by the latter gentleman to be beneficial in subduing the irritating qualities of the gas. His formula is the following: iodin. gr. viij, potass. iodid. gr. iij, alcohol. ℥ss, aquæ distillat. ℥vss. M. Of this solution,

¹ Medicinische Zeitung, No. 34. August 24, 1836. Berlin.

² Formulary—the Author's edition, p. 37. Lond. 1824.

³ On Temperature, Aliment, &c. 1829.

⁴ Cases illustrative of the efficacy of various medicines administered by inhalation in pulmonary consumption, 2d edit. Lond.; and Lond. Med. Gazette, Feb. 17, 1838, p. 804.

from one dram to six, and from twenty to thirty-five minims of a saturated tincture of conium are used in each inhalation, which is continued from half an hour to forty minutes. Sir Charles considers it better to add the conium at the time of employing the inhalation. At the temperature of 90° , the volatile properties of iodine are given off very sensibly, but the conium requires more heat, and that of 120° is not too much for the iodine. A learned reviewer in the *British and Foreign Medical Review*,¹ affirms, that his own experience leaves him no doubt as to the great value of the practice as a palliative in phthisis, and as an important remedy in bronchitis. It is true, however, he adds, that the relief has often been as great from the simple aqueous as from the medicated inhalation. Our own experience has not been favourable to it, and Mr. Pereira² says he has repeatedly tried it in phthisis as well as in other chronic pulmonary complaints, but never with the least benefit. The inhalation may be practised in the method recommended under the head of Chlorine, (page 127.)

The inhalation of iodine has been dreaded, because, in some instances, troublesome irritation of the larynx has followed its use; but Dr. Corrigan³ considers, that this injurious effect has resulted from the defective means of inhalation hitherto employed. Used in the manner he has recommended, and which we have described—under the article referred to above—gradual in its evaporation, and ultimately combined with a large portion of aqueous vapour, its use, he says, is positively free from any injurious irritative effects. The vapour he found to diminish most remarkably the profuse and wasting purulent expectoration of phthisis. The effects of iodine, thus used, on the digestive function were also very gratifying. In all the cases in which Dr. Corrigan employed it, the appetite and state of the intestinal canal were improved. It acted as a most useful tonic to the digestive organs, without any of the irritation, which its internal use, in the ordinary form, at times produces. It likewise greatly alleviated the cough, so that the patient was enabled to obtain hours of sound and refreshing sleep; and he consequently considers, that even should its use be of little avail against the destructive scrofulous ulceration, which constitutes phthisis, the palliative good, which is derived from it, renders it a valuable addition to our

¹ April, 1838, p. 606.

² *Elements of the Materia Medica*, Pt. i. p. 120. Lond. 1839.

³ *Dublin Journal of Medical Science*, for March, 1839, p. 103; and *Lond. Med. Gaz.* for April 6, 1839, p. 50.

list of remedies. Dr. Corrigan has had his apparatus at work from eight to twelve hours in the twenty-four; and his mode of managing it is as follows:—at night, when the patient is settling to sleep, the apparatus is suspended from the roof of the bed; and, when once arranged, it continues its work quietly and silently for four or five hours, while the patient, asleep, is all this time inhaling the medicated air. In the morning, for three or four hours before the patient rises, it is again at work; and, if necessary, in the midday, while the patient reclines on the bed, with the curtains drawn round three of the sides. The rate of evaporation, which generally gives a sufficiently strong impregnation to the air, is when the tincture of iodine drops from the cotton wick at the rate of from six to eight drops per minute. At this rate, about six drams of the tincture will be evaporated in an hour, and as every particle of the iodine is diffused in watery vapour through the air, there are thus diffused in the minutest state of division through the air, in every hour, about thirty grains of iodine. “If we suppose the patient to inhale only one twentieth of the iodine evaporated he will inhale in each hour, and apply to the diseased surfaces, one grain and a half of iodine in a state of the most minute division or solution.” “This quantity we know”—adds Dr. Corrigan—“is quite sufficient to exert a decided action upon scrofulous ulceration; for we find on reference to Lugol’s valuable work on the employment of iodine in scrofula, that in external scrofulous ulceration, the preparation of iodine which is found beneficial, is a solution which contains only about three grains of iodine in each pint of fluid. The duration of the inhalation can, of course, be extended at pleasure.”

Fontana affirms, that he has observed decided benefit from iodine in a case of phthisis mucosa; when given in the form of the *syrupus iodatus*, and combined with the external application of the ointment of tartarised antimony. Duverney has communicated some cases, which appeared favourable to the prophylactic agency of iodine in incipient or threatened phthisis, but he himself considers, that his observations have not been sufficiently numerous to effect the demonstration. We have frequently administered iodine, in various forms, in pulmonary tubercles, but it must be confessed, not with that decided advantage, which the well known sorbefacient virtues of the remedy, and the recorded observations of others, might seem to promise. We have never witnessed, on the other hand, the evil, which Riecke¹ mentions, that it may under particu-

¹ Die neuern Arzneimittel, u. s. w. S. 289; see, also, Gunther, in Harless’s Neue Jahrb. B. xii. St. 3. S. 161.

lar circumstances, occasion the speedy development of phthisis, where tubercles exist in the lungs. He refers to a case by Häser, as corroborative of his opinion. A woman, fifty years old, was affected with anchylosis spuria, for which an ointment of iodine was recommended; but it had not been employed more than three weeks, and not more than a dram of the hydriodate of potassa had been rubbed in, when symptoms of phthisis tuberculosa rapidly supervened, which, in half a year, terminated in death. There does not appear, however, in this case, to have been any thing more than a coincidence.

In tubercles of the liver iodine has been regarded worthy of special consideration.¹

Dropsy.—Many trials have been made with iodine in cases of dropsy, owing to its powerful sorbefacient agency.² Bradfield and Bardsley exhibited it frequently with success in hydrothorax and ascites; and Kissam, in a case of dropsy, dependent probably upon induration of the liver. Dr. Coster³ says he has removed many dropsies by giving internally from six to fifteen drops for a dose of a mixture composed of iodin. gr. iii., potass. hydriod. gr. vi., aquæ, ℥j; aided by an ointment composed of fifteen grains of iodine, with double the quantity of hydriodate of potassa, to an ounce of lard. This to be placed inside the thighs after removing the cuticle by a blister. The armpits and soles of the feet were also rubbed with the ointment.

The same plan is recommended by Dr. Osborne.⁴ Jahn regards iodine as one of the most important agents of modern discovery, and as an extremely valuable antihydropic.⁵ He first used it in a case of hydrocele, in which it was doubtful whether degeneration of the testicle had not been a precursor. The effect of the ointment of hydriodate of potassa left nothing to be desired; and, accordingly, he afterwards employed it in all cases of hydrocele of the tunica vaginalis, which he met with, even in the new born, united with mercury or extract of cicuta, and in every case, which was not of too chronic a character, it exhibited its sanative powers. The only unfavourable effects induced by it were a temporary disappearance of the testicle, in some cases; and a humid cutaneous eruption of the

¹ Riecke, *Op. cit.* S. 290.

² Dr. Wm. Stokes, in *Amer. Journal of the Med. Sciences*, May, 1834, p. 543, from *London Med. and Surg. Journal*.

³ *Journal de Pharmacie*, 1834.

⁴ *On the Nature and Treatment of Dropsical Diseases*, 2d edit. p. 48. Lond. 1837; and *Amer. Med. Library edit.* Philad. 1838.

⁵ Elliotson, in *Lancet*, 1830—31.

scrotum. He also found the iodine extremely useful in hydrothorax and ascites; especially in those cases of dropsy which succeed to exanthematous diseases, and that it acted more speedily and powerfully when combined with some diuretic.

He found, farther, that the iodine was followed by the most beneficial results in the hydrocephalus of children—as well chronic as acute—especially when the latter form had attained its full development, that is, when the inflammatory stage was over, and the accumulation of fluid was the prominent condition. In these cases, he commonly used the iodine in the form of the hydriodate of potassa, made into an ointment, and rubbed on the head. Frequently, however, he gave the iodine also internally, in combination with calomel and digitalis; but it may be objected to this combination, that iodine with calomel forms corrosive sublimate and the proto and deuto-iodurets of mercury, so that, in very small doses, it might affect the stomach too violently.¹ M. Ricord² employed the tincture of iodine with success in five cases of hydrocele;—the tincture being diluted with distilled water, and applied by means of compresses wetted with it, and in which the scrotum was enveloped. He uses it of four different strengths—3j, 3ij, 3iij, and 3vj of the tincture, to 3iij of water.

In hygroma, or dropsy of the bursæ mucosæ of the joints, an ointment of the iodide of potassium (3ij ad axung. 3j) has been most successfully used by M. Reynaud.³ The limb is kept at rest, and morning and evening, or three times a day, friction is made with this quantity of ointment; after which the knee—the joint commonly affected—is covered with a large flaxseed poultice. From some trials made with the iodide of lead, there was reason to believe it more efficacious than the iodide of potassium. The treatment was generally successful in about a fortnight.

As to its efficacy in *nervous diseases*, the testimony is somewhat discordant. Manson⁴ and Elliotson⁵ found it useful in paralysis, but Dr. Bardsley failed with it. Chorea was removed by Gibney⁶ and Bardsley; and Franklin,⁷ by very large doses, relieved a case of epilepsy.

¹ Riecke, Op. cit. S. 291.

² Journal des Connoissances Med.-Chirurg. Janvier, 1833.

³ Cabissol, in Bulletin Général de Thérapeutique, Fév. 1838.

⁴ Op. cit.

⁵ Lancet, 1830–31.

⁶ Ibid. 1827–8, p. 54.

⁷ Lancet, 1830, and Cogswell, Op. cit. p. 24.

The intimate affinity between iodine and the urinary organs, has given occasion to its employment in

Incontinence of Urine.—Corter cured two cases by the tincture of iodine.

Cutaneous Diseases.—Cases of dry, scaly tetter were treated, commonly, by Tünnermann, with an ointment made of the iodide of potassium, applied to the affected parts three or four times a day. For the most part, an increase of the evil was at first a pretty sure harbinger of a radical cure; when this attained a certain degree, a change in the organic actions of the skin succeeded; the remedy was then pretermitted, and the parts were washed a few times with soap, when the eruption faded away, and disappeared.

In moist tetter, Tünnermann applies only a very weak salve, with which the parts are touched daily two or three times: in the intervals, he envelopes them in dry linen rag. The pain, which is always induced by the application, soon passes away. Magendie, Gimelle, and Jeffray¹ have likewise applied it successfully in tetter. In chronic cutaneous diseases, in general, the various preparations of iodine are valuable remedies. They enter, as we have seen, the mass of blood, modify the condition of that fluid, and, in this manner, exert a new impression upon the capillaries of the diseased portions of the dermoid system. We have often employed them in these cases with success, and similar testimony has been afforded by MM. Biett, Gimelle, Kolley, Locher-Balber, and others. Brehme succeeded in removing, rapidly and completely, a case of inveterate porrigo favosa, and ophthalmia thereon dependent, by an ointment of iodine.

Amenorrhœa.—According to Coindet, iodine is a powerful emmenagogue, and the possession of this property has likewise been ascribed to it by Brera,² who frequently administered it successfully in amenorrhœa; and Formey and Nieustädt confirm his observations. Sablairoles cured three cases by frictions with iodine ointment on the breast, conjoined with the internal use of iodine. It was necessary, however, to give it in large doses, and for a long time. Locher-Balber³ found the iodine of use, at times, in those troublesome cases, which occasionally precede the establishment of menstruation; as well as Gölis, who was, however, often deterred from its use, in such cases, by the evil consequences it produced on

¹ Cogswell, *Op. cit.* p. 80.

² *Saggio Clinico sull' Iodio.*

³ Hecker's *Litter. Annal.* i. 275; and Cogswell on Iodine, p. 77.

the respiratory organs,—such as dry cough, or cough accompanied by bloody sputa.

Degeneration of the Ovaries.—Röchling observed a marked effect from the use of iodine in induration of the ovary. Jahn cured, by an ointment of iodine and mercury, an enormous degeneration of the ovaries, which gave rise to two tumours, each of the size of the head; and Messrs. Thetford,¹ Klaproth,² Jewel,³ and Ashwell⁴ were equally successful. Baron employed the iodine beneficially in a case of dropsy of the ovarium.

Of *hypertrophy of the mammae*, Delfiz⁵ details a case which resulted favourably; and in hypertrophy of the thymus gland—the asthma thymicum of Kopp—iodine baths have recently been advised by Dr. Fingerhuth. In hypertrophy of the ventricles of the heart, Magendie long ago recommended it.

In *scirrhus of the uterus, mammae, &c.*, it has been advised by Heun, Klaproth, Hennemann, Von dem Busch,⁶ Ullmann, Hill, Benaben, Magendie, Bermont, Hammer, Elwert; and, from the recorded observations, it would seem that great efficacy ought to be ascribed to it, both when internally and externally administered. Jahn extols it much in incipient scirrhus of the stomach, when combined with the application of leeches; and Riecke⁷ asserts, that his father found an ointment of iodine extraordinarily useful in a case of induration of the pancreas; and, also, in a case of scirrhus of the pylorus. In induration of the female mammae, not of a malignant nature, he likewise found it frequently of essential assistance. Magendie extols it in cancer of the tongue; and Benaben and Trüstedt employed it successfully in stricture of the urethra, supervening on badly managed gonorrhœa.

In several cases of chronic *disease of the liver*, attended with jaundice, Dr. Abercrombie⁸ found an ointment composed of ʒss of iodine, and an ounce of lard, of great benefit; and Dr. Milligan

¹ Transactions of the Dublin College of Physicians, v. 510. Dublin, 1828.

² Revue Médicale, Mars, 1824.

³ Op. cit.

⁴ Guy's Hospital Reports, vol. i.

⁵ Froriep's Notizen, B. xiii. No. 5, S. 73.

⁶ Hufeland's Journal, B. lx. St. 2, S. 81.

⁷ Op. cit. S. 292.

⁸ On the Stomach, Edinb. 1828; and Amer. edit. Philada.

prescribed it, in the form of tincture, with good effect in three cases of hypertrophy of the spleen.¹

Leucorrhœa.—A Parisian physician made the observation, that during the employment of iodine in goître, obstinate and protracted leucorrhœa disappeared; this induced him to try the remedy in the latter disease, and he found it very efficacious. Goeden and Broglio, likewise, observed it useful in malignant fluor albus; and Benaben, Richond,² De Salle, Caswall,³ and Broglio, in gonorrhœa. The last two individuals gave it especially in those cases, in which, without any marked inflammation, a deeply rooted gonorrhœa existed, with ulcers in the urethra and prepuce, not apparently of a syphilitic character. In chronic fluor albus, it was used by Müller⁴ with marked success. A young female had long suffered under this affection, which had reduced her strength, and did not yield to any of the means that had been employed, when the ointment of hydriodate of potassa was rubbed—morning and evening—on the inner surface of the thighs. After this plan had been continued for four weeks, the disease entirely ceased. MM. Gimelle and Jewell are also advocates for it.⁵

In *discharges from the nose*, iodine, in the form of hydriodate of potassa, has been used with advantage by Dr. Elliotson⁶ and by Mr. George Fayrer⁷—given internally, as well as employed in the form of injection, (ʒj ad aquæ ʒiv.)

In *secondary syphilis*, iodine has been recommended by Tyrrel, Saville, De Salle, Schlesier,⁸ and numerous others;—especially when the disease is complicated with scrofula, and the effects of mercurials. Wallace⁹ has likewise communicated some fortunate results from the administration of the hydriodate of potassa in secondary syphilis, and Ebers¹⁰ has confirmed his observations. More recently, Mr. Bullock¹¹ has reported the particu-

¹ Cogswell, Op. cit. p. 83.

² Archives Générales de Medecine, vol. iv.

³ Lond. Med. Gazette for 1834.

⁴ Wochenschrift für die gesammte Heilkunde, No. 40, S. 633. Oct. 1836.

⁵ Revue Médicale, vii. 249; and Practical Observations on Leucorrhœa, &c. by Geo. Jewell, p. 80. Lond. 1830.

⁶ Lancet, Feb. 10, 1838, p. 725.

⁷ Ibid. Feb. 24, p. 786.

⁸ Casper's Wochenschrift. Feb. 4, 1837, S. 78.

⁹ Treatise on the Venereal Disease. Lond. 1833.

¹⁰ Medicinische Zeitung, Oct. 5, 1836, S. 201 and 207.

¹¹ Edinb. Med. and Surg. Journal, Jan. 2, 1837. See, also, Cogswell on Iodine, p. 80; and Laycock, Lond. Med. Gazette, Mar. 2, 1839, p. 821.

lars of eleven cases of secondary syphilitic diseases, of a formidable character, relieved by the hydriodate of potassa, given internally, in doses of eight grains three times a day, in camphor mixture. The symptoms were:—destruction of the uvula and soft palate, or nodes, with nocturnal pains in the tibia, ulna, frontal and malar bones, and affection of the bones of the nose, or rupia and other tubercular eruptions. The period of cure was from one to two months. Mr. Mayo¹ has described it as efficacious in certain disorders, which are the consequence of syphilis, as emaciation, with ulcers of the skin; ulcerated throat, affections of the bones, &c., occurring in those to whom mercury had been given.

An iodine suppository appeared to Mr. Keate² to be beneficial in *enlarged prostate*.

In different forms of *rheumatism*, iodine has been given with success by Dr. Clendenning,³ in the Mary-le-bone Hospital, and a series of cases in which it was employed has been published by him. Sir B. Brodie⁴ twice relieved rheumatism by the tincture, although, in one of the cases, only temporarily. Cases of acute rheumatism, treated successfully by the iodide of potassium, used internally and externally, have been published by Dr. Mackay⁵ and Mr. Wardleworth.⁶

In *gout*, too, it has been prescribed. Jahn found it extremely effective in dispersing gouty tophi. Valentin found, that when iodine was given in a case of *goître*, complicated with gout, the tumefaction of the joints and the depositions gradually disappeared. Adopting the hint, he gave it in several cases of gout, with the effect of always mitigating the disease, and, at times, of completely curing it. Gendrin used the iodine not only in chronic gouty swellings with success, but also in acute cases. Ebers likewise confirms the efficacy of iodine in gout.

In *coxalgia*, Buchanan recommends the tincture of iodine to be applied by means of a small brush, as well as in a case of false joint, of which he has detailed a successful instance. A similar case has also been given by Treusen.

In *adiposis*, Von Gräfe⁷ prescribed it, and not without advan-

¹ Lond. Med. Gaz. xi. 249.

² Lancet, for 1832-3, p. 672.

³ Lond. Med. Gazette, May, 1835.

⁴ Lancet, for 1832-3.

⁵ Ibid. Mar. 2, 1839, p. 830.

⁶ Ibid. Mar. 30, 1839.

⁷ Walther und Gräfe's Journal für Chirurgie. B. ix. St. 3. S. 367.

tage. The case was accompanied by great voracity and sense of suffocation. Bleeding and cathartics were premised.

In *stomacace*, or a scorbutic state of the gums, the use of iodine has been recommended by Friedrich; as well as in *mercurial salivation*, by Kluge, Knod,¹ Klose,² Graves,³ and others; yet its efficacy appears to be somewhat doubtful in the last affection. Heyfelder found it of no value in three cases.

In cases of *hydrocele*, Velpeau⁴ prefers a solution of iodine to wine as *an injection*. He employs the tincture in the proportion of from one to two drams to an ounce of water. He treated successfully twenty cases by this method. Mr. J. R. Martin,⁵ of India, appears, however, to have anticipated him in this application of the remedy. Up to the time of the presentation of his paper to the Medical and Physical Society of Calcutta, (January, 1835,) he had used it successfully in upwards of ninety cases. More recently, he has communicated to the Medical and Physical Society of Calcutta the results of his subsequent experience. The number treated since March, 1832, at the Native Hospital, was seven hundred and seventy-seven: of these, seven hundred and sixty-six had a solution of tincture of iodine injected.

In order to ascertain whether it was by mere stimulation that the cure by the tincture of iodine was obtained, Mr. Martin treated ten cases with a common urethra syringe of undiluted Port wine, and one with diluted tinctura lyttæ, in the same proportion as that of iodine, ʒij to water ʒvj. Of this, two drams were injected and retained; the pain during twenty-four hours was excessive, and the inflammation, although not proportionate to the pain, was much longer in subsiding than when the tincture of iodine solution was used: this was also remarkably apparent in the cases treated with the undiluted Port wine.

Of the seven hundred and sixty-six cases treated, it does not appear that more than four failed.⁶

¹ Gazette des Hôpitaux, July 18, 1837.

² Medicinische Zeitung, No. 34, 1836. See, also, Amer. Journal Med. Sciences, Feb. 1834, p. 533.

³ Dublin Journal Med. Science, Jan. 1834.

⁴ Archives Générales de Médecine, Jan. 1837; La presse Médicale, Mai, 1837. See, also, Amer. Med. Intelligencer, July 15, 1837, p. 138; and Oct. 16, p. 263.

⁵ Amer. Journal of the Medical Sciences, Nov. 1837, p. 238.

⁶ Quarterly Journal of the Calcutta Med. and Physical Society, for Jan. 1837; cited in Amer. Journal of the Med. Sciences, for Feb. 1839, p. 485.

For hydroceles containing from six to thirty ounces of fluid, two drams of the solution of tincture of iodine are sufficient; for those containing from thirty to sixty ounces, three drams; and for those of a larger size, four to five drams. When the hydrocele contains less than three ounces, $\mathfrak{zj}$ of the injection is sufficient.¹

The cure is effected much sooner by the iodine; and if any infiltration takes place, it is readily absorbed.

Highly favourable results have also been obtained by MM. Oppenheim² and Fricke,³ and the method has been largely employed in this country, and with equal advantage. Two successful cases are likewise reported by Dr. Stewart.⁴

It is said by Coindet and Formey to have been efficacious in cases of *impotence*; and, lastly, Mr. Key⁵ regards it as one of the most efficacious remedies we possess in checking or controlling the *ulcerative process*—the most active phagedenic ulcers often yielding in a surprising manner to its influence, and assuming a healthy, granulating appearance.

With regard to the relative value of the preparations of iodine, Dr. A. Buchanan⁶ is inclined to place them in the following order:—Iodide of starch, hydriodic acid, (iodine,) and iodide of potassium; although he admits, that the superiority he ascribes to the first is, perhaps, owing to his having prescribed it most frequently. The action of all of these is, however, similar. The only mode, he thinks, of explaining the similarity of action on the body of substances so dissimilar in nature, is by considering the hydriodic acid as the active principle; free iodine being immediately converted in the stomach into hydriodic acid.

In the Glasgow Infirmary, they are in the habit of preparing a LIQUID HYDRIODIC ACID; by dissolving three hundred and thirty grains of the iodide of potassium in $\mathfrak{ziss}$ of distilled water; and two hundred and sixty-four grains of tartaric acid in a like quantity: the solutions are then mixed, and when the bitartrate of potassa has subsided, the fluid is filtered. Water enough is then added to make $\mathfrak{zvj}$ and $\mathfrak{zij}$. Each dram of this liquid acid contains five grains of iodine. The acid, thus prepared, is,

¹ Dujat, in Gazette Médicale de Paris, Sept. 1838.

² Zeitschrift für die gesammte Medicin. August, 1838, S. 389.

³ Ibid. S. 405.

⁴ India Journal of Medicine, May, 1836.

⁵ Medico-Chirurgical Transactions, xix.

⁶ Med. Gazette, July 2, 1836.

however, very liable to change, and necessarily variable in its effects.¹

Lastly ; from his researches on the effects of the various preparations of iodine, Dr. Cogswell² infers, 1. That iodine and hydriodate of potassa act very much in the same way, but that there is still a difference, not merely in point of power, but of specific properties. 2. That, whatever be the proper action of the iodide of sulphur, its facility of decomposition gives it a resemblance to iodine. 3. That the iodides of carbon, so far as examined, have an action peculiar to themselves : and, 4. That, in those metallic iodides which were submitted to examination, the preponderance of power is on the side of the bases.

METHOD OF ADMINISTERING.

The iodine is not easily given internally in substance—in the form of pill or powder ; neither are these forms to be recommended. Coindet preferred it in the form of tincture ; and this is one of the most common modes in which it is administered. When, however, the tincture is taken with water, a great part of the iodine is thrown down, and, it has been conceived, may thus exert a noxious influence on the stomach ; but in the small doses in which it is taken, such an effect can scarcely be anticipated. It would seem, however, that, in the generality of cases, when iodine has disagreed, it has been in the form of tincture. For this reason, of late years, iodine has been given more in watery solution ; and, to promote the solution, the iodide of potassium, (q. v.) is added ; or a little salt, according to Lugol's prescription. An ethereal solution is also prescribed. Externally, it is applied in the form of tincture, ointment, or watery solution, or in baths, or fumigations. Frictions with iodine readily occasion a considerable irritation of the skin, which commonly soon passes away, when the friction is suspended for a time. After bathing a part, painful rubefaction of the skin often ensues, which is usually followed by perspiration and sleep. The iodine is given internally, in the dose of one-eighth of a grain to a grain, twice or thrice a day.

The following are some of the forms in which the pure iodine is administered internally and externally.

¹ Guibourt, in *Revue Médicale*, Août, 1837 ; and *Bulletin Général de Thérapeutique*, Sept. 1837.

² *Essay on Iodine*, p. 167. Edinb. 1837.

Tinctura Iodini.

Tincture of Iodine.

(SYNONYME.—*Tinctura seu Alcohol Iodii.*)

℞. Iodini, gr. xlvij.

Solve in alcohol 35° (s. g. .842) ℥j.

To be given in some mucilaginous or saccharine fluid, or in wine and water.

COINDET AND MAGENDIE.

Mr. Durand, an able *pharmacien* of Philadelphia, finds, that forty grains of the iodine and ℥x of rectified spirit form a saturated solution. Based on this fact, the following formula has been given, which does not seem, however, to possess any advantages over the simple tincture.

℞. Iodin. optim. ℥ij.

Spirit. vini rect. ℥j.

Spirit. lavand. comp. ℥ij.

Dose.—Ten to twenty drops twice a day, gradually increasing it to forty.¹

Tinctura Ætherea Iodini.

Ethereal Tincture of Iodine.

SYNONYMES.—*Tinctura Iodii Ætherea.* (*French.*—Ether ioduré.)

℞. Æther. sulphuric. ℥i.

Iodini, gr. vj. M.

Dose.—Eight or ten drops, two or three times a day.

MAGENDIE.

Decoctum Cinchonæ cum Tinctura Iodini.

Decoction of Cinchona with Tincture of Iodine.

℞. Decoct. cinchon. ℥x.

Tinct. iodin. gtt. xc. M.

Dose.—Two spoonfuls, three times a day. In scrofulous ulcers.

REY.

¹ Ellis's Medical Formulary, 5th edit. p. 91. Philad. 1838.

Mistura Iodini.

Mixture of Iodine.

℞. Iodin. gr. v.
 Alcohol. ℥ij.
 Solve et adde
 Aq. cinnam. ℥iiss.
 Syrup. simpl. ℥iss. M.

To be taken in the twenty-four hours, in dram doses.

Syrupus Iodini.

Syrup of Iodine.

℞. Tinctur. iodin. gr. vj.
 Syrup. simpl. ℥ij. M.

HENRY.

Solutio Iodini. (LUGOL'S.) (French.—*Boisson iodée.*)

Solution of Iodine.

(1. For internal use.)

	A.	B.	C.
℞. Iodin.	gr. ½.	gr. ⅔.	gr. j.
Sodæ muriat.	gr. xij.	gr. xij.	gr. xij.
Aquæ destill.	℥j.	℥j.	℥j.
			Solve.

(2. For external use.)

	A.	B.	C.
℞. Iodin.	gr. ij.	gr. iiij.	gr. iv.
Aq. destill.	℥j.	℥j.	℥j.
			Solve.

Lugol gives formulæ for the solution of the three different strengths above.

Unguentum Iodini.

Unguentum Iodatum, Ointment of Iodine. *French.*—Pommade d'Iode. *German.*—Iodsalbe.

℞. Iodin. gr. iiij.
 Adipis, ℥ij. M.

Linimentum Iodini.

Liniment of Iodine.

℞. Linim. sapon. comp. ℥j.
 Tinct. iodin. ℥j. M.

MANSON.

Cataplasma Iodini.

Cataplasm of Iodine.

℞. Tinct. iodin. ℥ss.
 Pulv. sem. lin. ℥j.
 Farin. avenæ, ℥iij.
 Aquæ destillat. q. s. ut fiat cataplasma.

Used as a cataplasm in scrofulous tumours and goître.

THE IODIDE OF STARCH, Iodidum seu Ioduretum Amyli, Amylum Iodatum; *French*, Iodure d'Amidon; *German*, Iodstärkmehl, Iodstärke, Starkmehl- oder Satzmehliodüre, has been extolled by Dr. Andrew Buchanan,¹ of Glasgow. It is prepared of iodine gr. xxiv.; starch, in fine powder, ℥j. The iodine is first triturated with a little water, and the starch is gradually added, the trituration being continued till the compound assumes a uniform blue colour. The iodide is then dried with a heat so gentle as not to drive off the iodine, and it must be afterwards kept in a well stopped bottle.

Iodine, in the usual forms of exhibition, cannot in general be safely given in larger doses than four or six grains daily, whilst, in the above formula, Dr. Buchanan has given as much as seventy-two grains daily.

Professor Forget, of Strasbourg, has published the case of a youth seventeen years of age, who took in 48 days, 139 ounces, or nearly nine pounds, of this iodide, containing 3336 grains, or nearly six ounces, of iodine,—being nearly sixteen grains a day.²

AN IODIDE OR IODURET OF QUININE, Iodidum Quininæ, is formed by precipitating sulphate of quinine by means of hydriodate of potassa. It is a yellow precipitate, soluble in alcohol, and crystallises from this solution in quadrangular prisms. It has been employed for the cure of scrofulous tumours, in cases where iodine and tonics are indicated.³

THE IODIDE OR IODURET OF SULPHUR, Iodidum seu Ioduretum Sulphuris—prepared by mixing 125 parts of iodine with 16 of sulphur, and then gently heating the mixture over a slow fire or

¹ Lond. Med. Gazette, July 2, 1836; see, also, Soubeiran, in *Revue Médicale*, Août, 1837.

² *Gazette des Hôpitaux*, Fév. 19, 1839, and *Lond. Med. Gaz.* April 20, 1839, p. 127.

³ *Journal de Chimie Médicale*, Mars, 1836.

spirit lamp, until they fuse into one mass—has been strongly recommended in tinea capitis; in the proportion of ten grains of the iodide to an ounce of lard. A writer, in an English periodical¹ affirms, that he was induced to make trial of it in some obstinate cases, and was much astonished at the remarkable power it possessed over the disease. He rubbed it on the head night and morning, and increased the strength of the ointment according as the affected part was able to bear the stimulus, until the iodide bore the proportion of half a dram to the ounce of lard or spermaceti cerate.

Fumigations of iodine and sulphur have been used advantageously in certain atonic ulcers, and chronic cutaneous diseases.² With this view, the sulphur and the iodine may be combined extemporaneously—say half a dram of the iodine to an ounce of sulphur.

The other preparations of iodine are contained in different parts of this volume.

LACTUCARIUM.

SYNONYMES. Lettuce Opium, Thridace.

German. Lattich-Opium.

The ancient Greek and Roman physicians were well aware of the hypnotic property of the common garden lettuce (*lactuca sativa*), the milky juice of which contains the *lactucarium*. It would appear, however, that Dr. J. R. Coxe, of Philadelphia, was the first to propose the use of the inspissated juice in medicine.³ Dr. Duncan, Senr., of Edinburgh, subsequently paid particular attention to the subject, and recommended it as a remedy in phthisis, in place of opium.⁴ The properties of the juice have also been investigated by M. François,⁵ a French physician.

¹ Lond. Med. Gazette, for Sept. 9, 1837, p. 879.

² London Lancet, vol. i. 1838; and Encyclographie des Sciences Médicales, Août, 1838.

³ Wood and Bache's Dispensatory.

⁴ Observations on Consumption, 2d edit. Edinb. 1816.

⁵ Archiv. Général. de Médecine, 1825. Journal Univer. xl. 254, and xli. 147.

METHOD OF PREPARING.

There are three kinds of lactucarium. The *first* and best, but the most costly, is obtained from incisions made into the stalks, whence the juice exudes, which is subsequently dried in the air. This preparation has a bitter taste, soon becomes of a brown colour and solid, has a gummy fracture, but absorbs moisture from the air, becoming soft and clammy.

The *second* variety is obtained by expression of the selected stalks, and subsequent desiccation of the obtained fluid, either in the air or by artificial warmth. This is said to be the variety most commonly met with in commerce;¹ and the *third* variety is prepared in the same manner as any common extract, from all parts of the plant. This is the *Thridace* of some.

The first is the strongest and most uniform, and therefore to be preferred.

Chemical examination shows that the lactucarium contains neither morphine nor narcotine, as had been supposed.

EFFECTS ON THE ECONOMY.

To investigate these, Rothamel² instituted experiments with the Paris lactucarium. Half a grain to a grain produced no effect. From three to five grains occasioned a peculiar indescribable feeling of lightness over the whole body, without any narcotic symptoms or modification in the pulse: from six to eight grains increased this sensation, and caused dilatation of the pupils. The same doses, repeated at intervals of three or four hours, through the day, diminished the number of pulsations of the heart, and the sleep was disturbed. From ten to fifteen grains caused more indisposition, nausea, oppression in the epigastrium, cold sweats, anxious respiration, cold sensation in the chest, great dulness, vertigo, considerable dilatation of the pupils, yawning and stretching, slow pulse, disturbed sleep, general prostration; the tongue to be coated with mucus; disagreeable taste; loss of appetite; pains in the shoulders and bones, and uncertain gait; all which symptoms were speedily removed by a few drops of acetic ether or a glass of Rhenish wine. Coffee was much less efficacious.

¹ Riecke, Die neuern Arzneimittel, S. 313. See also Mérat & De Lens, Dict. de Mat. Méd. art. *Lactuca Sativa*.

² Ferussac's Bulletin des Sciences Médicales, xxii. 101. Paris, 1830.

The lactucarium has been extolled by numerous physicians as equally effective with opium, whilst it is not—they assert—followed by the signs of narcosis and other inconveniences, so often induced by the latter. Accordingly it is frequently given where a pure sedative is needed—to allay cough, and where much nervous excitement is present.

MODE OF ADMINISTERING.

The lactucarium is given internally, either in the form of solution or pill, in the dose of from one third of a grain to three grains. Externally, it has been applied in the form of plaster or of ointment.

Mistura Lactucarii.

Mixture of Lactucarium.

- ℞. Lactucar. ʒj.
 Mucilag. gum. acac. q. s. ad subactionem.
 Perfectè unitis adfunde
 Aq. fontan. ʒvj.
 Syrup. rub. idæi, ʒss. M.

Dose.—Two spoonfuls every two hours, in spasmodic cough, sleeplessness and hysteria.

HILDENBRAND.

- ℞. Acid. boracic. ʒij.
 Lactucarii, ʒj.

Solve in

- Aq. destillat. ʒvj.
 Syrup. papav. ʒss. M.

Dose.—A small spoonful—in cases of “spastic hæmoptysis.”

ROTHAMEL.

MAGNES.

SYNONYMES.—Magnet.

French.—Aimant, Pierre d’Aimant.

The natural magnet was employed of old both externally and internally, and in the most diversified forms and affections.¹ The

¹ Art. Aimant, in Dict. Univers. de Matière Médicale par Mérat & De Lens.

artificial magnet has been used within the last century only, and always with a view to its magnetic action.

It is generally on the diseased part, or around it, that the magnet is applied, and the application is made for a longer or shorter time according to circumstances—being at times drawn along the nerves of the affected part, at others applied in a more prolonged manner.

It is on the nervous system—and chiefly through the influence of the imagination—that the magnet exerts its efficacy. Accordingly, the class of diseases in which it has been found most beneficial are those termed “nervous and spasmodic.”¹ This is strikingly shown by the published observations of MM. Andry and Thouret,² Commissioners of the Société Royale de Médecine, appointed to examine into this matter. In cases of spasms, palpitations, convulsions, epilepsy, tremors, cramps, neuralgia, rheumatism, &c. the only agent employed was the magnet, and it was wholly successful. These gentlemen, however, were disposed to infer that the magnet exerts an incontestable magnetic action on the nervous system, to which, in part at least, the curative agency must be ascribed, and their conclusions were thought to be corroborated by cases observed by Alibert, Cayol, Chomel, Recamier, &c. The celebrated Laennec,³ who employed the magnet in the manner recommended by Hallé, that is, by establishing a magnetic current through the diseased parts by means of several magnetised plates, affirms, that he frequently found it moderate the pain in pulmonary neuralgia, diminish the oppression in nervous asthma, suspend spasmodic hiccough, and exhibit its utility in simple neuralgia of the heart, and in angina pectoris. In the last disease, the application of a small blister under the anterior plate appeared to render the effects of the magnet more marked.

It is not many years since considerable interest was excited in London by the success, said to have been obtained in the treatment of neuralgia, toothach, and other affections of the nerves, by the application of the ordinary magnet or mineral magnet, as it was termed by Dr. Blundell who employed it.⁴

It would appear, too, that owing to a considerable demand for

¹ See the Author's General Therapeutics, p. 58. Philad. 1836.

² Mém. de la Société Royale de Médecine de Paris, pour 1776, p. 531, and Thouret, Art. Aimant, in Encyclopéd. Method. Partie Médicale, i. 421. Paris, 1786.

³ Traité de l'Auscultation Mediate, 2d edit. tom. ii.

⁴ See Lancet for 1833, and American Journal of the Medical Sciences, Nov. 1833, p. 247.

loadstone, the conductors of the *Bulletino delle Scienze Mediche*,¹ of Bologna, were led to make enquiries concerning the uses to which it was put. From these it appeared, that the Ex-Bey of Algiers, whilst at Leghorn, in 1831, mentioned to a Catholic dignitary, Father Campagnoli, who was suffering under gout, that the application of the loadstone was an oriental remedy for the disease, and of certain efficacy. He immediately procured a piece of loadstone, as he had been subject to regular and frequent attacks of gout since 1805, and its application removed the next paroxysm. Since this time, he has always had recourse to the same remedy, and has found, that the attacks come on less frequently and severely, and that they invariably yield, so that he has rejected all his former plans of treatment. On the first symptom he goes to bed, and places the loadstone in close contact with the pained part; he presently falls asleep, and awakes free from pain, and able to walk. The loadstone he uses weighs five pounds, and has smooth sides. He has recommended this plan to other gouty individuals, who have experienced similar relief.

We have witnessed the application of the mineral magnet repeatedly, in nervous diseases in persons of highly impressible habits; but except in such, and apart from the effects of the imagination, we have seen no beneficial results.

MANNITUM.

SYNONYMES. *Saccharum Mannæ*, Mannita, Mannite.

German. Mannit, Mannazucker, Mannastoff.

This principle, which was first discovered by Proust, belongs to the varieties of sugar that are not susceptible of fermentation, and constitutes the chief ingredient of manna. Its presence is not confined, however, to that substance. It is met with in several other vegetable juices—cucumbers, melons, celery, beets, &c. Yet in these it is first found after fermentation, so that chemists have been disposed to regard it as a product of fermentation.²

¹ Marzo et Aprile, 1835; and *British and Foreign Medical Review*, July, 1836, p. 246.

² Art. Mannite, in Mérat & De Lens, *Dict. de Mat. Méd.*

METHOD OF PREPARING.

Mannite is commonly procured from manna. Manna *in lachrymis*, as it is obtained in commerce, is treated with boiling alcohol, filtered, and suffered to crystallise; by rest and refrigeration mannite is precipitated in small, beautiful, white needles. The manna in tears consists almost wholly of mannite. Common manna, on the other hand, contains but little thereof, and in its place has a yellow extractive matter to which cathartic properties have been assigned; the coarse manna consists almost wholly of the latter. To obtain the mannite, the manna in tears is consequently selected.

Should the administration of mannite, as a remedial agent, become more common, it may be worth the trouble to enquire, whether it might not be advantageous to prepare it from the vegetable juices above mentioned.

Mannite, prepared in the above manner, is of a white colour; soluble in five parts of cold water, and in almost every proportion in boiling water; it seems to be entirely insoluble in cold absolute alcohol; is somewhat more so in boiling alcohol, and still more so in boiling alcohol which contains water. At from 221° to 230° Fahrenheit, it melts into a colourless, adhesive fluid, and crystallises on cooling. When more strongly heated, it burns, and is decomposed like sugar. From its alcoholic solutions it separates on cooling, in white, silky, shining, needle-shaped crystals, collected in stelliform roundish masses.

When mannite is dissolved in an equal weight of boiling water, and the fluid is evaporated by a strong fire and rapid ebullition, until a small portion placed on a cold glass plate rapidly becomes solid, it may be poured out into shapes.

The taste of the sugar of manna is feeble, but agreeably sweet; it is inodorous, or at least nearly so. According to Liebig, mannite consists of 40.0228 of carbon, 7.6234 of hydrogen, and 52.3537 of oxygen.

The *granatine* of the pomegranate root agrees so much with the mannite in its properties, that both have been regarded as the same substance.

EFFECTS ON THE ECONOMY.

According to Magendie,¹ mannite may be advantageously substi-

¹ Formulaire, &c. dern. édit.

tuted for manna; as it possesses the cathartic property without the nauseous flavour. The dose is two drams for children, and, at times, as much as half an ounce; but, in the latter case, Magendie always found the catharsis too active: for this reason he considers the latter to be the best dose for the adult. He recommends, that a syrup should be prepared from it, and that this should be prescribed both as a cathartic for children at the breast, and as an addition to other articles in cases of pulmonary catarrh.

M. Solon has likewise spoken favourably of the therapeutical advantages of the sugar of manna. He administered it in three cases of gastricism—in two of them combined with castor oil—in which it induced, in a few hours, critical evacuations; and in a case of peritonitis, occasioned by obstinate constipation, its use was followed by the best effects. In the last case, the inflammation completely disappeared, without any other agency, when the constipation yielded. It was found, likewise, of essential service in convalescence from bronchitis and pneumonia. Only in two cases of females—the one labouring under ascites—the other under phlegmasia dolens, did the mannite fail to have any aperient agency. This, it was presumed, was probably owing to both of the patients having been habituated to the use of powerful cathartics, and to there not being enough of the preparation to admit of the administration of the appropriate quantity.

According to Solon, mannite may be given in the dose of one or two ounces dissolved in from two to four ounces of a hot aromatic water, the solution to be taken warm, otherwise it forms a stiff, adhesive mass; or it may be added to the ordinary cathartic potions. He assigns it the preference over manna and castor oil; *first*, because it has an agreeable saccharine taste, and *secondly*, because it is always equally good, whilst those substances are often deteriorated, and on that account uncertain in their effects. It appeared to him to be peculiarly adapted for cases in which it was desirable to evacuate the intestines with as little excitation as possible.

Magendie in his recent lectures on the blood, classes mannite amongst the substances that promote the coagulation of that fluid.¹

¹ Leçons sur le Sang, &c. &c. Translation in Lond. Lancet for Jan. 26, 1839, p. 636.

MORPHINA.

SYNONYMES.—Morphinum, Morpium, Morpheum, Morphia, Morphine, Papaverine.¹

German.—Morphin.

The discovery of this principle is ascribed to Séguin and Sertürner, who were engaged in the chemical analysis of opium upwards of thirty years ago, and although the former may have first detected it, the latter deserves the credit of having improved our acquaintance with it, and of having attracted to it the attention of chemists and physicians.

METHOD OF PREPARING.

The following is M. Robiquet's method²:—he boils a very concentrated solution of opium with a small quantity of magnesia—ten grains of the latter to a pound of opium—for a quarter of an hour. By this means, a tolerably copious, grayish precipitate is formed, which is collected on the filter, and washed with cold water. The well dried precipitate is then digested with weak alcohol for some time, at a temperature short of ebullition; by which means a very small quantity of morphine, and a considerable quantity of colouring matter, are separated. The liquid is then filtered, and the residue washed with a little cold alcohol. It is then boiled for some time in pure alcohol, and filtered again whilst the liquid still boils. On cooling, the morphine is obtained, which, by repeated crystallisation, may be freed from the attached colouring matter.

The process of Hottot is greatly followed in France. It is a modification of that used by Sertürner, and similar to that adopted in the Pharmacopœia of the United States, and in the new London Pharmacopœia.

In this, opium is exhausted by tepid water, and the clear liquid is evaporated to a density of 2° of Beaumé. Whilst the liquid is still tepid, a small quantity of ammonia is added, in order to render it neutral or even slightly ammoniacal. In this manner, a brown, resinoid precipitate is thrown down, which contains only traces of morphine and narcotine. The liquor is filtered, and by the addition of a fresh quantity of ammonia to it when cold, crystalline

¹ Jahn's Handwörterbuch der Chemie, B. iii. S. 150.

² Annales de Chimie et de Physiq. v. 276.

morphine is thrown down, which, when collected, dissolved in alcohol, and evaporated, is set aside to crystallise.¹

Dr. F. Bache regards the process of the U. S. Pharmacopœia, as an improvement upon the last, and as being essentially the same with that of Dr. Edward Staples, which was published in the *Journal of the Philadelphia College of Pharmacy*.²

Mr. Brande considers the process proposed by Robertson and Gregory to be the simplest and the best.³ Chloride of calcium is added to a strong aqueous solution of opium to precipitate the acids by which the alkaloids are held in solution; it is then filtered and evaporated to the consistency of syrup, and set aside to crystallise, the crystals are strongly pressed to squeeze out the mother liquor, which contains narcotine and other impurities. The pressed crystals are then purified by solution, crystallisation, and the action of animal charcoal, till they are obtained colourless; they consist of the hydrochlorates of morphine and codeine; they are dissolved in hot water, and ammonia is added, which throws down morphine, and which, being separated upon a filter, may be redissolved in boiling alcohol, and obtained in crystals. The liquor, from which the morphine has been precipitated, contains codeine, together with hydrochlorate of ammonia, and some morphine; it must be evaporated until it crystallises, and the crystallised mass must be dissolved in a small quantity of water, and be decomposed by excess of a solution of caustic potassa; codeine is thrown down, and, when redissolved in ether, may be obtained in crystals. See Codeine.

Tilloy, Petit, and others, have obtained morphine on the large scale from the domestic opium.⁴

Morphine is composed of oxygen, hydrogen, carbon, and azote. The crystals are completely white, translucent, almost transparent, and slightly opaline; they are wholly inodorous. In the form of powder, morphine is of loose texture, and as fine as magnesia. It melts at a trifling degree of heat, and very much resembles, in this state, melted sulphur; but it crystallises again on cooling. It is sparingly soluble in hot water; and in cold water scarcely at all so. Boiling water, according to Choulant, dissolves one eighty-second

¹ *Journal de Pharmacie*, x. 479.

² Vol. i. p. 15: see the excellent Dispensatory of the United States, by Drs. Wood & Bache, 4th edit. Phil. 1839. For Fauré's process, see *Journal of the Philadelphia College of Pharmacy*, ii. 71. Philad. 1831.

³ *Dictionary of Materia Medica*, p. 333. Lond. 1839.

⁴ Art. Morphine, in Mérat & De Lens, *Dict. de Mat. Méd.*

part; according to Jahn, only one four hundredth; and according to Bally,¹ it is even less soluble than strychnine, which, he says, requires 6000 parts of water for its solution. It is more readily soluble in alcohol, and still more so in ether, as well as in fixed and volatile oils: the solutions have a nauseous, bitter taste. It is alkaline in its nature. The crystals appear to be rectangular four-sided prisms. With all the acids it forms peculiar, readily soluble, and very bitter salts, of which the sulphate, acetate, and muriate are the most used.

EFFECTS ON THE ECONOMY IN HEALTH.

Generally—it has been affirmed—morphine acts on the nervous system like opium, but does not exert the same agency on the vascular system. Magendie² asserts, that it possesses all the advantages of opium without any of its disadvantages. Bally³ took especial pains to investigate the effects of morphine on the organism, and the results he communicated to the Académie Royale de Médecine, of Paris. The most striking was its action on the brain, which, when sufficient doses were administered, appeared to cause death by sanguineous apoplexy, as Bally had an opportunity of observing in one case, on dissection. In this there were no traces of injection of the membranes of the brain, whilst under the arachnoid much albuminous serum was effused, and there was an extravasation of blood into the left hemisphere of the brain.

This result is especially to be apprehended in those persons who have experienced an apoplectic attack previously. Bally found, moreover—which does not accord with our experience—that the morphine was more soothing and soporific in small doses than in larger. It occasioned, in the latter case, cerebral confusion, vertigo, perversion of the senses, and a feeling of electric agency, which commenced in different parts of the trunk and also in the extremities; but no delirium supervened, and the intellectual faculties experienced no alteration. In consequence of these effects on the sensorium, the energy of the motory apparatus suffered. By long administration, morphine, like opium, excited troublesome tremors. The pupils Bally found contracted under its use, when larger

¹ Mémoire de l'Académie Royale de Médecine, i. 99.

² Formulaire pour la Préparation, &c. de plusieurs nouveaux Médicaments.

³ Revue Médicale, Février, 1824, and Mem. de la Société Royale de Médecine, i. 142.

doses were given, which is entirely opposed to the ordinary effect of narcotic agents. Not unfrequently when morphine was continued, the soothing and soporific effect was preceded, for some days, by restlessness, and loss of sleep. Very often it excited headach. On the vascular system it did not act as an excitant—neither rendering the pulse quicker, more frequent, nor tenser. The opposite effect seemed, indeed, to be induced by it. It has no action, Bally affirms, as an emmenagogue; produces no diaphoresis—which does not, by the way, at all accord with our observation—does not even augment the animal heat, or redden the face, but frequently causes itching either over the whole surface of the body, or topically; in the latter case, the sensation being chiefly felt in the face, neck, loins or genitals. At times, the itching is associated with an eruption of conical weals or bumps, which are either red or of the ordinary colour of the skin, and can generally be detected more readily by the touch than the sight. On the organs of respiration the morphine exerts no influence; and as to its effects on the digestive organs, it may be remarked, that it has no agency on the mouth, pharynx, or œsophagus, except that ptyalism has been observed to result from it. The tongue is not made red or dry, nor are the tonsils. It does not excite thirst; but, at times, there is a sense of bitterness in the mouth, which is a forerunner of its effects on the stomach. The appetite is not diminished, except when the emetic properties of the morphine are developed in a high degree. Vomiting is not caused by large doses only, but in many individuals by small doses, and it may be very violent. Commonly, morphine causes constipation, on which, at times, diarrhœa supervenes. Very frequently, also, colic is induced by it.

Morphine possesses, according to Bally, vermifuge properties. In men he found it to excite frequently ischuria, but not in women. The urine, however, exhibited no change of character.¹

Our own view of its action—when no idiosyncrasy interferes with its ordinary operation—is that it exerts a decided sedative influence on the nervous and sanguiferous systems; and this accords with the experiments instituted on animals by Mr. Blake.² He found, when it was introduced into the veins of an animal, that it exhibited its effects upon the heart, by rendering its pulsations slower and diminishing the pressure of the arterial system.

As in the case of opium, the system may, under excessive pain

¹ Richter's *Specielle Therapie*, 2te Auflage, S. 358. Berlin, 1825.

² *Edinb. Med. and Surg. Journ.* April, 1839, p. 344.

or long continued use, be so habituated to its action as to bear very large doses. Mr. Lingen,¹ of Hereford, has published a case in which a female, under a painful affection, took scruple, and, according to her own report, half dram doses of the acetate; and Mr. Teevan,² of London, one of a gentleman, labouring under a disease of the spinal cord, attended with violent spasms of the muscles of the chest, abdomen, and inferior extremities, who took, on one occasion, twenty-five grains in the twenty-four hours.

EFFECTS ON THE ECONOMY IN DISEASE.

Morphine, it is thought, may often be administered advantageously, not only where opium is indicated, but where it disagrees. Riecke³ remarks, that where diaphoresis is needed it cannot supplant opium, but in this we apprehend he is mistaken, at least in febrile and inflammatory diseases. In such cases we have observed a sedative dose of opium succeed in restoring the cutaneous transpiration more effectually than any other agent, by allaying the pathological condition on which the suppression of perspiration was dependent. With many persons and in many cases it possesses decided advantages over opium, but we have often found where opium disagreed, morphine and its preparations did so likewise.

As a general rule, it may be said, morphine is proper, where opium, in sedative doses, is demanded; hence it is had recourse to in febrile and inflammatory diseases, where there is much pain or sleeplessness—singly or combined, and in the various neurotic affections.

On account of the very sparing solubility of morphine in water, it is but seldom prescribed; although Bally—in opposition to many experimenters—asserts, that he has found it equally efficacious with its salts. As, however, this result is doubtless owing to the existence of acid in the stomach, and, consequently, is liable to uncertainty, it is advisable to give the salts of morphine the preference, which are administered in nearly the same doses as the pure morphine itself.

METHOD OF ADMINISTERING.

Pure morphine is only given internally in the form of powder or

¹ Lond. Lancet, Jan. 26, 1839, p. 680.

² Ibid. for Feb. 9, 1839, p. 738.

³ Die neuern Arzneimittel, u. s. w. S. 327.

of pill, beginning with from one sixteenth to one fourth of a grain once or twice a day, and gradually increasing the dose to one grain and a half. If its use has been discontinued for some days, the dose, when resumed, must be again small, and be gradually increased.

Haustus Morphinæ.

(*Potio Narcotica.*)

Draught of Morphine.

℞. Morphin. gr. $\frac{1}{4}$
Aq. destillat. ℥j.
Syrup. papav. ℥j. M.

To be taken at bedtime.

Enema Morphinæ.

(*Injectio Leniens.*)

Injection of Morphine.

℞. Ol. amygdal. dulc.
Ol. lilior. aa. ℥ss.
Morphinæ, gr. ij.

To allay pain in the ear, the suffering in acute blennorrhagia, and the tenesmus in hemorrhoids, &c.

BERKA.¹

MORPHINÆ ACETAS.

SYNONYMES.—Morphium Aceticum, Acetas Morphei, Acetate of Morphine.

French.—Acétate de Morphine.

German.—Essigsaures Morphin.

METHOD OF PREPARING.

The acetate of morphine is obtained by mixing morphine and acetic acid in an appropriate vessel, and gradually evaporating to dryness, at a temperature of about 90° Fahr. This mode of preparation is required, owing to the difficulty of obtaining the acetate crystallised, in consequence of its extreme deliquescence. Crys-

¹ Ricettario Clinico. Padova, 1825.

tallised acetate of morphine may, however, be prepared by dissolving morphine in alcohol, saturating with acetic acid, filtering the solution, and evaporating gradually in a vessel covered over with thin rag. The acetate crystallises in an arborescent manner on the sides of the vessel.

The acetate of morphine is one of the substances, which, in the experiments of Magendie,¹ were found to promote the coagulation of the blood.

METHOD OF ADMINISTERING.

The dose of this article is from a quarter of a grain and less, to a grain or more. Its strength does not vary materially from that of pure morphine.

Liquor Morphinæ Acetatis.

Solution of Acetate of Morphine.

- ℞. Acetat. morphin. gr. xvj.
 Aquæ destillatæ, ℥vj.
 Acid. acetic. ℥ij. M.

This formula was proposed by the author² as a substitute for the "*gouttes calmantes*" of Magendie,³ which permit the deposition of the morphine when kept for a short time. The dose is from six to twenty-four drops.

- ℞. Morphin. acetat. gr. xvj.
 Aquæ distillat. ℥j.
 Acid. acetic. gtt. iij vel. iv.
 Alcohol. ℥j. Fiat solutio.

MAGENDIE.

Syrupus Morphinæ Acetatis.

Syrup of Acetate of Morphine.

- ℞. Morphinæ acetatis, gr. iv.
 Syrupi simplic. ℥j.

Dissolve the salt in half a dram of water, acidulated with a few drops of acetic acid; filter, and add it to the syrup.

¹ Leçons sur le Sang, &c., and translation, in London Lancet, Jan. 26, 1839, p. 636.

² Formulary, &c., translated from Magendie, by C. T. Haden, Esq., 2d edit., by Robley Dunglison, M. D. p. 14. Lond. 1824. Amer. edit. Philad. 1825.

³ Formulaire, &c.

This syrup is recommended and used in Paris, in place of the syrupus papaveris. It has the advantage of being always of uniform strength.

MAGENDIE.

The acetate of morphine has been much used *endermically* in the diseases mentioned under the head of MORPHINE. A quarter or half a grain or more is placed on some part of the skin, whence the cuticle has been removed; and it may be repeated, as the case may require. In the severer neuralgic and neurotic cases, the quantity applied in this way is sometimes very large. In a case of hydrophobia reported by Dr. Burne,¹ of London, ten grains at a time were sprinkled on a blistered surface, with excellent tranquillising effects. At times, when applied to a blistered surface for several days in succession, a papular eruption has been observed, which quickly becomes vesicular, proceeding from the edges of the blister, and gradually spreading over the entire surface.²

It has been likewise proposed to inoculate with morphine. If the point of a lancet, dipped in an aqueous solution of morphine, be inserted horizontally, about one line in depth beneath the epidermis, and be allowed to remain there a few seconds, the following effects, according to M. Lafargue, are observed:—About a minute and a half after the operation, a small pimple, with a diffuse rosy areola, and slightly itching: in about twenty minutes, the pimple becomes about four lines in diameter, and one line in thickness, and is flattened: its colour is somewhat deeper than that of the skin; it is hard; the areola very red, and about an inch and a half in diameter; its heat is increased, but the sensation of itching remains about the same. During the first hour, the pimple and its areola are at their highest degree of development, after which they gradually disappear.

The general effects, which M. Lafargue experienced from thirteen punctures thus made on the anterior part of his forearm, were,—heaviness of the head, frequent yawnings, clamminess of the mouth, and an invincible desire to sleep; yet the quantity of muriate of morphine employed could not have exceeded a quarter of a grain. He considers, that the inoculation of morphine may supersede the use of blisters and ammoniacal plasters, and that it deserves employment more particularly where the object of the physician is to produce the local effects of morphine. Its effects

¹ Lond. Med. Gaz., April, 14, 1838.

² Dr. A. T. Thomson, in Lond. Lancet, for Jan. 19, 1839, p. 622.

as a rubefacient are marked, and hence its probable utility in superficial neuralgia, and in chronic rheumatism.

The experiments of Lafargue were repeated by M. Martin Solon, with nearly the same results.¹

The acetate may, also, be applied in the form of ointment; and it is frequently added to glysters, in cases of chronic diarrhœa. Hildenbrand recommends the following ointment to be rubbed on the pubes in cancer of the uterus.

Unguentum Morphinæ Acetatis.

Ointment of Acetate of Morphine.

- ℞. Morphinæ acetat. gr. iv.
 Ung. hydrarg. ciner.
 ——— simpl. aa. ʒij.

A piece, the size of a pea, to be rubbed on twice daily.

Dr. Francis Gérard, of Avignon, has found the acetate so highly useful in Asiatic cholera, that he prefers it to all other remedies. Of ninety-nine patients treated thereby, eighty-one were cured. He found, when given early, that it especially checked the vomiting, and moderated the subsequent reaction, after which the other symptoms gradually ceased. When, however, the resources of art had been long postponed, the effects of the remedy were less marked; the vomiting and the other symptoms persisted longer; the supervening reaction was much more tardy, and frequently ended in a state of collapse, which, under the most trifling imprudence, produced an unfortunate result. Gérard administered the acetate at first in the dose of one-fourth of a grain every half hour, until the serious symptoms were removed, and he omitted it as soon as the spasms and the diarrhœa and vomiting had ceased, or as soon as reaction ensued.

A solution of acetate of morphine, which he terms *liquor opii*, has been proposed by Mr. Houlton.² He prepares it as follows:—Take two ounces and a half of the best Turkey opium; thirty-two fluid ounces of Beaufoy's acid, the strength of pickling vinegar: macerate with a gentle heat for six days, frequently shaking the vessel; then filter, and evaporate the fluid to the consistence of the

¹ Bulletin de l'Académie Royale de Médecine, Nos. 1 & 7, 1836-7.

² Lond. Med. Gazette, Aug. 12, 1837.

extracts of the pharmacopœia, finishing the evaporation by the spontaneous method. This Mr. Houlton employs under the name *extractum opii aceticum*. To the above extract he adds alcohol five fluid ounces; distilled water thirty-five fluid ounces; macerating for eight days, and filtering.

This *liquor opii* is about the strength of the *tinctura opii* in sedative property, and Mr. Houlton affirms, from his observations, that it is in no respect inferior to Battley's *liquor opii sedativus*,—a secret preparation, which has been much used.

MORPHINÆ SULPHAS.

SYNONYMES.—Morphium Sulphuricum.

French.—Sulfate de Morphine.

German.—Schwefelsaures Morphin.

METHOD OF PREPARING.

Morphine is dissolved in dilute sulphuric acid. The solution is then evaporated by heat, and suffered to crystallise, which it does in silken tufts.

EFFECTS ON THE ECONOMY.

The general effects on the economy in health and disease resemble those of the acetate of morphine, to which it is perhaps to be preferred on account of its greater uniformity. There is an advantage, however, in retaining both preparations in the *materia medica*, as when the system becomes accustomed to the one, the other may be substituted.

In his experiments on the blood Magendie¹ found that the sulphate of morphine—unlike the acetate and the muriate—opposed the coagulation of that fluid.

A *syrupus morphinæ sulphatis*, a *liquor morphinæ sulphatis*, and an *unguentum morphinæ sulphatis* may be formed in the same manner as with the acetate of morphine.

¹ Leçons sur le Sang, &c.; and translation in London Lancet, January 26, 1839.

The common form for the solution of sulphate of morphine is the following:¹

Liquor Morphinæ Sulphatis.

Solution of Sulphate of Morphine.

℞. Morphin. sulph. gr. ij.
Aquæ distillat. ℥ij. Fiat solutio.

Dose.—A tea-spoonful (which is considered to be equivalent to about twelve or fourteen drops of laudanum,) to be repeated as occasion may require.

The *muriate*² and the *citrate of morphine* are likewise occasionally used; but they possess no advantage over the preparations described above. The former is officinal in the last London Pharmacopœia.

Many years ago, Dr. Porter, of Bristol, recommended a *liquor morphinæ citratæ* to be prepared in the following manner:—Beat four ounces of the best crude opium in a mortar, with two ounces of crystallised citric acid; mix well with a pint of boiling water; filter after twenty-four hours' maceration. Dr. Paris speaks well of this preparation.³ Magendie recommends the substitution of the following process:

℞. Morphin. pur. gr. xvi.
Acid. citric. crystalliz. gr. viij.
Aquæ destillat. ℥j.
Tinct. coccinel. q. s. Fiat solutio.

Dose.—Six to twenty-four drops in the twenty-four hours.

A *tartrate of morphine* was suggested by Mr. Haden⁴ as a substitute for the *liquor opii sedativus*, of Battley. Mr. Haden made

¹ The Medical Formulary, &c. By B. Ellis, M. D. p. 132. Philadelphia, 1838.

² For Dr. Wm. Gregory's mode of preparing the muriate, see Edinb. Med. and Surg. Journ. for April, 1831; Amer. Journ. for Aug. 1831, p. 531; and Philad. Journal of Pharmacy, iii. 124. See, also, Mr. M. Robertson, in Edinb. Med. and Surg. Journ. April, 1832.

³ Pharmacologia, 4th Amer. 7th Lond. edit. By Dr. J. B. Beck, p. 439. New York, 1831.

⁴ Translation of Magendie's Formulary, 2d edit. By Robley Dunglison, M. D. &c. p. 19. Lond. 1824.

it by macerating the dregs remaining after making the tincture of opium in a solution of tartaric acid. Forty drops acted in all respects like twenty of the liquor opii sedativus. It neither stimulated nor induced costiveness.

Of late, the *bimeconate of morphine* has been brought before the notice of the profession by Mr. Squire,¹ but he has not given the formula for its preparation. Impressed with the idea that the combination of the active principle of opium, as prepared by nature, would prove more beneficial as a therapeutical agent than the artificial salts, he instituted a number of experiments, with the view of procuring the bimeconate as free from the other ingredients of opium as possible; and he asserts that at length he obtained a tolerably pure salt, which, from the trials that have been made with it, has fully answered his expectations as to its superior medicinal power over the other preparations of opium. The salt is given in solution, made nearly of the same strength as laudanum.

Dr. Macleod, who made trial of it, asserts, that it appeared to him to be a very mild and efficient preparation, rarely producing headach or other discomfort; and that it repeatedly answered, in the most satisfactory manner, where opium had disagreed, and succeeded in some cases where the other salts of morphine—the acetate and hydrochlorate—had failed to give relief.

Equally strong testimony in its favour is afforded by Dr. A. T. Thomson, who details three cases—one of neuralgic pain of the left side of the face; another of wakefulness, without any apparent cause, and a third of anomalous pain of the hip and thigh, all benefited strikingly by its use.

NARCOTINA.

SYNONYMES.—Narcotinum, Narcotine, Opiane, Matter or Salt of Derosne.

French.—Matière ou Sel de Derosne, Sel Essentiel d'Opium.

German.—Narkotin, Opian, Derosne's Opiumsals.

On this substance, which is one of the immediate principles of opium, and which has attracted the attention of many chemists and

¹ Lond. Med. Gaz. Mar. 9, 1839.

therapeutists, much uncertainty exists with regard to its precise properties. It seems, that it has not hitherto been found except in opium.

METHOD OF PREPARING.

It is commonly obtained, either from the aqueous extract of opium, by means of ether, which only dissolves the narcotine, and consequently requires but to be evaporated to obtain it; or from crude opium, which has been exhausted by cold water; it may hence be obtained from the residue after the preparation of the aqueous extract of opium of the shops.

With this view, the opium is twice treated with boiling acetic acid at 2° or 3° ; it is precipitated by ammonia, and the washed precipitate is purified by treating it with hot alcohol at 40° and a little animal charcoal; the liquid is then filtered, and the pure narcotine is precipitated on cooling.

It crystallises in very white needles; is devoid of taste and smell; fusible in the manner of resins, and very slightly soluble in water; soluble, with the aid of heat in alcohol, and in the volatile and the fixed oils; very soluble in ether, which distinguishes it from morphine; very soluble also in cold acetic acid, whence it is precipitated on heating the solution—another mode of separating it from morphine. It is coloured of a vivid red by nitric acid; and is analogous, in some respects, to the crystallisable resins or *sub-resins* of M. Bonastre.¹

EFFECTS ON THE ECONOMY IN HEALTH.

These have been so contradictory, that it has been conceived, the same preparations cannot have been used by different observers.²

According to Magendie,³ morphine is the anodyne principle of opium, and narcotine the exciting. When a grain of narcotine, dissolved in oil was given to a dog, it produced a state of stupour, which superficial observers might readily confound with sleep; but it differed evidently from sleep; the animal's eyes were open;

¹ Mérat & De Lens, Dict. de Mat. Méd. Art. Narcotine.

² Ibid. and Dict. des Sciences Médicales, xxxiv. 298.

³ Formulaire pour la Préparation, &c. de plusieurs nouveaux Médicaments.

the respiration was not deep as in sleep, and it was impossible to arouse it from its sluggish condition. Death generally took place in twenty-four hours. When combined with acetic acid, it produced quite different effects. Animals could bear a dose of even twenty-four grains without dying, and whilst under its influence, they were agitated by convulsions like those which camphor induces—exhibiting the same signs of fright, the same backward motions, foaming at the mouth, convulsions of the jaws, &c. When morphine and narcotine were both given at the same time, the different effects of each occurred together. A grain of morphine, for example, and a grain of narcotine dissolved in acetic acid, were placed in the pleura of a dog. The animal soon became drowsy and fell asleep under the influence of the morphine, but a singular and remarkable strife appeared to go on for an hour and a half, between the stimulating effects of the narcotine and the anodyne effects of the morphine. At length, however, the animal slept soundly, being probably, Magendie suggests, under the influence of the morphine alone. His opinion is, that narcotine is injurious when not united with an acid, and very exciting when so united.

M. Orfila—the celebrated toxicologist—it appears, has entertained various views upon the action of narcotine; at one time considering it inert, at another to possess the same action as morphine; and, at another, to concur, when combined with morphine, in the properties of opium, but to a slight degree—since opium, deprived of narcotine, is not less deleterious—and to possess another *modus operandi* than opium, without, however, our being able to regard it as the exciting principle.¹

Owing to all these uncertainties connected with it, narcotine is little if at all employed in medicine. It would seem, however, that the exciting properties of opium do not appertain exclusively to it; for, as has been elsewhere remarked, there are many persons, who are as disagreeably affected by morphine alone as they are by opium which contains both morphine and narcotine.

¹ Mérat & De Lens, *Op. cit.*, and Orfila, *Toxicologie Générale*, ii. 69.

NUX VOMICA.

SYNONYMES.—Vomic Nut, Poison Nut, Bachelor's Buttons.

French.—Noix Vomique.

German.—Krähenaugen.

EXTRACTUM NUCIS VOMICÆ SPIRITUOSUM.

SYNONYMES.—Extractum Nucis Vomicæ Resinosum, E. Nucis Vomicæ Alcoholicum, Spirituous, Resinous or Alcoholic Extract of Nux Vomica.

French.—Extrait Alcoolique de Noix Vomique.

German.—Geistiges Extrakt der Krähenaugen.

In the year 1809, Magendie discovered that one entire class of vegetables—the bitter strychnos—has the power of exciting the spinal marrow, without implicating, except indirectly, the functions of the brain.¹ Since then, many have confirmed the observations of Magendie, and have attended especially to its agency in various diseases. The preparation of the strychnos most used—if we except the active principle—has been the alcoholic extract of the nux vomica.

METHOD OF PREPARING.

Take any quantity of rasped nux vomica ; exhaust it by repeated macerations in alcohol of 40° (.817), and evaporate it slowly to the consistence of an extract. Alcohol of less strength may be used, but, according to Magendie, the product will be proportionably less active. A dried alcoholic extract is made by dissolving in water the alcoholic extract made by means of alcohol at 36° (.837); filtering and evaporating in appropriate dishes, as in making the dry extract of bark.

EFFECTS ON THE ECONOMY.

According to Magendie, a grain of this extract, absorbed from any part of the body, or mixed with food, promptly destroys a dog of considerable size, by inducing paroxysms of tetanus, which, by their continuance, arrest the respiration sufficiently long to induce

¹ *Examen de l'action de quelques végétaux sur la moëlle épinière.* Paris, 1809; and *Formulaire*, &c.

complete asphyxia. When the dose is much stronger, the animal appears to die entirely from the action of the *nux vomica* on the nervous system.¹

If an animal be touched whilst under the action of the substance, it experiences a commotion similar to that of a strong electric shock, and this takes place each time the contact is renewed. On dissection no morbid appearances exist which can account for death.

When introduced into the frog's stomach, Dr. Lombard,² of Geneva, found that it produced tetanic convulsions, which, in a few hours, caused death. The contractions of the heart were sometimes strong and complete, sometimes irregular, tumultuous, and intermitting; always diminished in frequency. Applied to the heart itself, it slightly stimulated it, rendering the pulsations more energetic and frequent, whence Dr. Lombard concludes that the *nux vomica* cannot be used with advantage in any diseases of the heart; for, although it diminishes the frequency of the pulsations, it renders them irregular.

The action of the extract on healthy man is the same as that described by Magendie, and if the dose be sufficiently large, death speedily follows with the same symptoms.³ In those that are affected with paralysis the effect is also the same, but what is singular, it is particularly manifested on the paralysed parts by tetanic convulsions, and a feeling of creeping, which indicate the operation of the remedy; a local perspiration is also often observed to break out on some parts of the body. When administered in cases of hemiplegia the contrast between the two sides of the body is rendered striking; whilst the sound side remains at rest, the other may be violently agitated; tetanic shocks may supervene and a copious perspiration break out. In a female, Magendie saw the affected side covered by a peculiar eruption, whilst the other side afforded no trace of it. There is a difference even between the two sides of the tongue, a decidedly bitter taste being occasionally perceived on the one, whilst the other exhibits nothing similar.

If a much larger dose be given, both sides of the body participate, but unequally, in the tetanic spasms, so that the patient is

¹ Ségalas, in *Journal de Physiologie*, par Magendie, Oct. 1822.

² *Gazette Médicale de Paris*, Oct. 10, 1835.

³ See the details of two cases of poisoning by *nux vomica*, in *Lond. Med. Rep.* xix, 448 and 456: Christison on Poisons, and Brande, *Dictionary of Materia Medica*, p. 375. Lond. 1839.

sometimes thrown out of bed by the violence of the contractions. When given in very small doses, it has not immediately any perceptible effects, and some days elapse before its advantageous or noxious properties can be appreciated.

According to Magendie¹ the extract may be given in all diseases that are attended with debility, general or local, and in paralysis of all kinds, general or partial. He himself observed excellent effects from it in marked cases of debility of the genital organs, incontinence of urine, &c. He also used it in several cases of partial atrophy of the upper and lower extremities with advantage. As regards its administration in cases of paralysis succeeding to apoplexy, he remarks, that it should not be given until some time after the *coup de sang* in the brain, which occasioned the palsy; and that even then beneficial results can be expected only when no marked organic mischief exists; indeed, in the latter case, he considers the disease irremediable, and that bad effects might result from pushing the remedy.

The efficacy of the alcoholic extract of nux vomica in various forms of paralysis has been confirmed by many observers. Even before Magendie had employed it, Fouquier² had given it in several cases of paralysis, with the most satisfactory results. Since then we have had the testimonies of Chauffart,³ Gendron,⁴ Perrussel, Récamier, Mauricet, Baxter,⁵ Galli, Hauff, Wenneis, Burkard, Pétrequin,⁶ Gellie,⁷ and numerous others in its favour.

Our own experience with it in cases of hemiplegia has not been limited; yet although we have succeeded in inducing tetanic movements in the limb, we have not been satisfied that much advantage has been derived from it;⁸ nor are the results of the experiments and observations of Jahn by any means in accordance with those of the practitioners just mentioned. He tried it in numerous cases of paralysis, but affirms, that he did not see any good effect from it, and with the exception of two cases, did not notice the slightest action, although the extract was carefully prepared according to

¹ Formulaire pour la Préparation, &c. de plusieurs nouveaux Médicaments, &c.

² Bulletin de la Faculté de Médecine, &c. vol. v. 1818.

³ Journ. Génér. de Méd. Oct. 1824.

⁴ Journ. Général. Nov. 1829.

⁵ New York Medical Repos. vol. viii.

⁶ Gazette Médicale de Paris, Nov. 3, 1838.

⁷ La Lancette Française, Août 29, 1837.

⁸ See, also, Chauffart, in Op. cit.

the formula given by Magendie. Yet, he remarks, he was by no means sparing in the dose. In the two cases in which a change seemed to be induced, there was an evident increase of the paralysis.

This discrepancy, as well as other evidences of the same contrariety of experience, may doubtless have been partly owing to difference in the strength and quality of the preparation; and hence the value of the strychnine—its active principle—which is not liable to the same uncertainty.¹

In cases of partial paralysis, as in *colica pictonum*, amaurosis,² palsy of the rectum, &c., both the alcoholic extract of the *nux vomica* and its active principle have been used and with good effect (see *Strychnina*.)

Cazenave gave the extract successfully in a case of St. Vitus's dance, which had resisted every other remedy. Sir Charles Scudamore found it useful in neuralgia, especially in neuralgia faciei. Vogt gave it—not without advantage—in cardialgia; Hildenbrand in epilepsy; by the Russian and Polish physicians it was administered advantageously in choleric diarrhœa; and by many it has been strongly advised in chronic diarrhœa and dysentery³ as well as in dyspepsia, in the varieties termed pyrosis and gastrodynia, especially when they appeared to proceed from morbid irritability of the nerves of the stomach.⁴

MODE OF ADMINISTERING.

The best form for exhibiting the alcoholic extract of the *nux vomica*, according to Magendie, is in pill, when we are desirous of inducing the tetanic convulsions. Each pill may contain a grain of the extract. One or two pills may be given at first, and the dose be daily augmented until the required effect be induced. It

¹ Richter's *Specielle Therapie*, u. s. w. B. x. S. 352. Berlin, 1828.

² Pétrequin & Miquel, in *Bulletin Général de Thérapeutique*, Juillet, 1838.

³ Most's *Encyclopädie*, 2te Auflage, Art. Dysenteria, i. 573. Leipz. 1836. Geddings, *N. American Archives*, No. 2, Nov. 1834. Dr. Roots, in *St. Thomas's Hospital Reports*, No. iii. for April, 1836; and Hufeland, in *Bally*, *Bull. Génér. de Thérap.* Février, 1838.

⁴ Mellor, in *Med. Gaz.* Mar. 4, 1837, p. 850. Dr. H. S. Melcombe, *ibid.* Mar. 25, 1837, p. 964; and *Amer. Med. Intell.* July 1, 1837, p. 124. Dr. M. Huss, in *Zeitschrift für die gesammte Medicin.* May, 1837, 393, and *Amer. Med. Intell.* Aug. 1, p. 162.

may then be discontinued to avoid accidents. It is better, he thinks, to give the pills in the evening, as night is the most favourable time for observing the phenomena we are desirous of inducing. It is sometimes necessary to increase the dose to twenty or thirty grains, before the tetanic effects supervene, but commonly from four to six grains are sufficient. Esquirol saw two cases, in one of which death took place after eighteen grains; in the other, after five; the stomach and bowels were found inflamed. Elliotson began with half a grain of a well prepared extract, and increased the dose every day, or every other day, by a quarter of a grain; but none of the patients bore a greater quantity than seven grains, and few more than four.

If from any cause the administration of the remedy has been interrupted for some days, it is necessary to recommence with the small doses, and to increase them again gradually as before.

When it is desirable to produce only the slow effects of the remedy, a grain or half a grain daily is sufficient.

Magendie directs a tincture to be made from the extract—the *Tinctura Nucis Vomicae*, *T. Strychnos*, *T. Nucum Vomicularum*, which has been introduced into some of the pharmacopœias. It is made by taking three grains of the dried alcoholic extract of the nux vomica, and dissolving it in an ounce of alcohol at 36° (.837). It is given by drops, and in mixtures, in those cases, in which the alcoholic extract itself is indicated.

Tinctura Nucis Vomicae Composita.

Compound Tincture of Nux Vomica.

- ℞. Extract. nuc. vomic. spir. gr. xxiv.
Camphoræ, ʒj.
Tinct. pyrethri, ʒj. M.

Dose.—Twenty drops, four times a day, with arnica tea, in cases of paralysis. VOGT.

- ℞. Tinct. nucis vomicae,
Tinct. cantharid.
Naph. phosphorat.¹ ʒij. M.

Dose.—Thirty drops, three or four times a day, with arnica tea, in the paralysis of torpid subjects. VOGT.

¹ The Naphtha phosphorata, Æther sulphuricus phosphoratus, is made by dissolving twenty-eight grains of phosphorus in four ounces of rectified ether.

Mistura Nucis Vomicae.

Mixture of Nux Vomica.

- ℞. Extract. nuc. vomic. spirit. gr. ij—iv—vj.
 Aquæ melissæ, ℥vj.
 Mucilag. gum. acac. ℥ss. M.

Dose.—Two spoonfuls, every two hours, in epilepsy.

HILDENBRAND.

A similar form is recommended by Richter¹ in dysentery. Two table-spoonfuls every two hours.

Pilulæ Nucis Vomicae.

Pills of Nux Vomica.

- ℞. Ext. nuc. vomic. spirit. ℥j.
 Ext. glycyrrhiz. ℥vij.
 Misce et fiat pilulæ lxxx.

Dose.—Two to six, two or three times a day, in paralysis.

Pulveres Nucis Vomicae.

Powders of Nux Vomica.

- ℞. Bismuth. nitrat. præcip.
 Ext. nucis vomicae spirit. aa. gr. ss.
 Magnes. carbonat. gr. iij.
 Sacch. alb. gr. xv.
 Ol. menth. pip. gtt. ij.

Misce, et fiat pulvis.

Dose.—One, every three hours, in cramp of the stomach.

VOGT.

- ℞. Gum. arabic.
 Sacchar. aa. gr. xij.
 Pulver. nucis vomic. gr. iij. M. et fiat pulvis.

Dose.—One of these powders, to be repeated according to circumstances in the twenty-four hours, in diarrhœa and dysentery.

HUFELAND.

¹ Die specielle Therapie, ii. 133. Berl. 1821.

Embrocatio Nucis Vomica.

Embrocation of Nux Vomica.

- ℞. Tinct. nucis vomicae, ʒj.
Liquor. ammon. caust. ʒij. M

To be rubbed on the paralysed limbs, and on the surface in cholera. See Strychnina and its preparations.

OLEUM CROTONIS.

SYNONYMES.—Oleum Tiglii, Croton Oil.

French.—Huile de Pignon d'Inde.

German.—Krotonöl.

The seeds of the Croton Tiglium—a tree indigenous in the Molucca Isles, Ceylon, Java, &c. and which belongs to the class Monœcia, order Monadelphia of Linnæus, and to the natural family Euphorbiacæ—are characterised by their acrid drastic properties—which, indeed, belong to the whole family. These seeds were carried by the Dutch to Europe, two centuries ago, and were admitted into the old Pharmacopœias, under the names Grana Tiglii, G. Tiglii, G. Molluccæ, &c. being prescribed as a drastic cathartic, but owing to their too violent operation, which frequently induced unpleasant results, they fell subsequently into entire disuse. The oil of croton was also introduced into Europe about the same period, and was occasionally used internally. It had, however, sunk into total neglect, when attention was recalled to it by Dr. Conwell, a physician in the English East India Company's service at Madras, by whom its employment was reintroduced into Europe; and, in a short time, it acquired so much repute as an active cathartic, that it was received into various Pharmacopœias.¹

Croton oil is a thickish fluid, of a honey yellow colour, has a disagreeable smell, and a very acrid burning taste, so that it excites inflammation of the tongue and fauces. It is a fixed oil, having a very acrid matter associated with it, which appears to have acid qualities, and is probably identical with the iatrophic acid.² In

¹ Recherches sur les propriétés médicales et l'emploi de l'huile du Croton Tiglium, &c. Paris, 1824.

² Riecke, Die neuern Arzneimittel, u. s. w. S. 343.

absolute alcohol, it is almost wholly soluble; in common alcohol, only partly so; and in ether and turpentine wholly so.

EFFECTS ON THE ECONOMY.

Croton oil holds a distinguished place amongst cathartics, inasmuch as it can be given in small doses; and, in cases of great torpor of the intestines, its action is very certain. Even a drop commonly produces eight or ten fluid evacuations; but at times, in unusual torpor of the canal, as many as four or five drops, and even more, have been given in the course of ten or twelve hours. Like most of the drastic cathartics, it occasions tormina, but these are less distressing than the burning sensation it commonly excites in the pharynx, which is least felt when the oil is given in the form of pill or lozenge.

Not unfrequently, also, it causes nausea, often ending in vomiting in delicate persons, or where the dose has been large, but without interfering materially with the cathartic effect. At times, it is formed into a soap with caustic soda—*Sapo olei crotonis*—which is given in doses of from one to three grains. This soap is said to be less excitant and to occasion less pain than the pure oil, and it has the advantage, that the dose can be better apportioned.

As with other cathartics, the incautious employment of the croton oil may occasion inflammation of the intestinal canal, and therefore, it need scarcely be said, its use during inflammation of the canal is contra-indicated. It does not appear to affect any other secretory organs than those of the bowels, although some physicians affirm that they have remarked an increase of the urine after its use.

Like other active cathartics, it has been employed as an anthelmintic, especially in cases of tape worm, by Poccinotti, and others, and with success.¹

Croton oil has likewise been employed externally as a revellent or counter-irritant—at times to induce a cathartic effect, but in this respect it is uncertain.² Rubbed on the surface in small quantity, it induces inflammation of the skin, which gradually disappears of itself. When the friction is longer continued, pustules are caused,

¹ Richter's *Specielle Therapie*, B. x. S. 248. Berlin, 1828.

² See a case of Ileus cured in this manner, by Dr. Susewind, of Lützerath, in Casper's *Wochenschrift für die gesammte Heilkunde*, Jun. 24, 1837, S. 404.

which, when they are numerous, run together or are confluent, and around the spot where the confluent eruption is seated, papulæ or pimples appear over a wider extent, which are transformed into pustules, and are surrounded by a red base or areola. When the pustules are discrete, they dry up more rapidly than when they run together; and in the latter case they commonly form scabs. Friction readily excites pustulation on the head, face, neck, chest, and on those parts of the extremities where the skin is thin. Where it is thicker, the effect is of course induced with more difficulty. Commonly the eruption is perceptible in twelve hours after the first friction, but at times not till a later period: very rarely is the second friction ineffectual. In the course of from three to six days the eruption again disappears.

The pain usually commences in about an hour after the rubbing, being at first nothing more than a slight itching and burning, which gradually, but markedly, augments; yet the eruption is never so painful as that caused by the ointment of tartarised antimony, or by the plaster of the same agent, with which it is capable of fulfilling the same indications.

These frictions with croton oil are adapted for all cases in which local counter-irritation is required. They have been recommended of late by many physicians—as by Andral,¹ Elliotson, Hutchinson,² Short, Landsberg, Romberg, and others, in the following affections: In chronic inflammations, and such as have a tendency to exsudation; in chronic rheumatic and gouty diseases, in aphonia,³ and chronic hoarseness,⁴ phthisical affections, especially in incipient phthisis; and in the neuroses—as spasmodic asthma, whoopingcough, paralysis, &c.

The croton oil has likewise been used as a direct excitant. Campanelli⁴ gives a case of paralysis of the upper eyelid, which was promptly relieved by the application of four drops of croton oil to the affected lid, and the eyebrow.

MODE OF ADMINISTERING.

Internally, the dose is from one eighth to one fourth and one

¹ Gazette Médicale, Janv. 1832, and Archives Générales, Août, 1833.

² London Lancet, May, 1833, and Dr. Sauer, in Medicin. Zeitung, Aug. 10, 1836, S. 158, and Amer. Med. Intell., Nov. 1, 1837, p. 286.

³ Romberg, in Wochenschrift für die gesammte Heilkunde, 1835.

⁴ Dr. Sauer, in Medic. Zeitung. Aug. 10, 1836, S. 158.

⁵ Annali Universali di Medicina, July, 1835.

half a drop, given every three or two hours, or more frequently, if necessary. The dose is rarely carried higher except in desperate cases, and in mental affections, for which it is peculiarly appropriate.

It may be given either in the form of emulsion or of pill. Hahnemann¹ and Hufeland recommended it as a substitute for castor oil, which is expensive in Germany; advising, that a drop of the croton oil should be added to an ounce of the oil of poppies, and that the mixture should be called *Oleum Ricini Officinale*. This preparation is well adapted for emulsions.

When applied externally, to excite an eruption, from four to six drops or even more may be rubbed in twice a day. In women and children, a single application may be sufficient; but if the skin be thick and insensible, it will be well to rub it previously with flannel, or to apply first a rubefacient, especially when it is desirable to produce the effect speedily. On the other hand, where the skin is excitable, the croton oil should be mixed with an equal portion of some mild fixed or volatile oil before being used.

Emulsio Olei Crotonis.

Emulsion of Croton Oil.

- ℞. Olei crotonis, gtt. iij.
- Olei amygdal. ℥ss.
- Gum. acac. ℥ij.

Misce sensim terendo cum

- Syrup. flor. aurant. ℥j.
- Aq. chamæm. ℥v. M.

Dose.—A spoonful every two hours, until it operates—shaking the vial. PHOEBUS.²

- ℞. Olei crotonis, gtt. i—ij.
- Olei cham. simpl. gtt. ij.

Terendo misce cum

- Mucilag. gum. arabic.
- Syrup. amygdal. aa. ℥ss. M.

Dose.—A tea-spoonful every two hours—shaking the vial.

LOCKSTAEDT.

¹ Apotheker Lexicon, B. ii. Abth. 1. S. 203.

² Handbuch der Arzneiverordnungslehre, Th. ii. Berlin, 1836.

Pilulæ Olei Crotonis.

Pills of Croton Oil.

- ℞. Olei crotonis, gtt. iv.
Micæ panis q. s. ut fiant pilulæ viij.

Dose.—One, or two, or more.

- ℞. Olei crotonis, gtt. v.
Saponis,
Gum. acaciæ, aa. ʒj.

Misce et fiant pilulæ xx.

Dose.—One to three.

SUNDELIN.

- ℞. Olei croton. gtt. ii.
Micæ panis
vel
Saponis, ʒj.

M. et divide in pilulas viij.

Dose.—One to four.

Haustus Olei Crotonis.

Draught of Croton Oil.

- ℞. Tinct. ol. croton. f. ʒss.
Syrup.
Mist. acaciæ, aa. f. ʒij.
Aquæ destill. f. ʒss. Fiat haustus.

After swallowing a little milk, this draught must be taken very quickly, and be washed down with the same diluent. NIMMO.

Mistura Olei Crotonis.

Mixture or Emulsion of Croton Oil.

- ℞. Olei crotonis, gtt. ii.
Mucilag. acac. ʒij.
Aquæ, ʒj. M.

Dose.—A fourth part, every two hours, until the desired effect is induced.

Mistura Olei Crotonis Saponacea.

Saponaceous Mixture of Croton Oil.

- ℞. Olei crotonis, gtt. viij.
 Potassæ puræ, gr. vj.
 Aquæ destillat. ℥ij. M.

Dose.—Three to six drops.¹

- ℞. Ol. crotonis, gtt. ij.
 Sacch. alb. ℥ij.
 Gum. arab. ℥ss.
 Tinct. card. f. ℥ss.
 Aquæ destillat. ℥x. M.

Dose.—Two dessert-spoonfuls, to children ; to be repeated every three or four hours if necessary.

Trochisci Olei Crotonis.

Lozenges of Croton Oil.

- ℞. Olei crotonis, gtt. ij.
 Sacch. alb. ℥j.
 Mucilag. gum. acaciæ, q. s. ut fiant

Trochisci, non torrendi, No. viij.

Dose.—One every two hours, until the desired effect is induced.

SEILER.²*Sapo Olei Crotonis.*

Soap of Croton Oil.

- ℞. Olei crotonis, partes ij.
 Liquor. potassæ, partem j,

Triturate in the cold, and when the mixture has acquired the proper consistence, run it into moulds of pasteboard, and, in the course of a few days, remove it by slices.

Dose.—Two or three grains in water, or in the form of pill.

CAVENTOU.

Pope³ recommends a *Tinctura Granorum Tiglii*, or a tincture of the seeds, to be made of two ounces of the seeds from which the rinds have been carefully removed, with one ounce of alcohol.

¹ Ellis's Medical Formulary, 5th edit. p. 37. Philad. 1838.

² Hufeland's Journal, B. lix. St. 4. S. 134 ; und Rust's Magazin, B. xviii. St. 2, S. 358.

³ Medico-Chirurgical Transactions, p. i. vol. xiii.

This is allowed to digest for six days, and is then filtered. The smallest dose for an adult is twenty drops. This preparation, he says, has the advantage of excluding the more acrid drastic matter contained in the epidermis and husk, whilst the kernel affords cathartic material enough to act powerfully and certainly.

OLEUM JECINORIS ASELLI.

SYNONYMES.—*Oleum Morrhuæ*, *O. Jecoris Aselli*, Codliver Oil.

French.—Huile de Morue, Huile de Foie de Poisson.

German.—Stockfisch Leberthran, Berger Thran, Gichtthran, Leberthran.

The animal fat, which appears under this name in commerce, is obtained from several of the fishes belonging to the genus *Gadus*, order *Malacopterygii thoracici*, but especially from the codfish (*Gadus morrhua*); the Torsk (*Gadus callarias*); the Coalfish, (*Gadus carbonarius*), and the Burbot (*Gadus lota*.)

Several varieties of the oil are met with in commerce, which differ from each other by their brighter or darker hue, and by their greater or less transparency. The clearest sort is admitted into the shops of continental Europe, especially, under the name *Oleum jecinoris aselli album seu depuratum*: as a remedial agent it is more used than the darker variety, although several physicians affirm, that they have found the latter more efficacious.¹

METHOD OF PREPARING.

According to Riecke,² the oil is obtained by exposing to the sun the livers of the fishes above mentioned, cut in slices, and collecting the fixed oil that runs out. That which is first obtained resembles fine olive or poppy oil, and is called the yellow codliver oil—*Oleum Jecinoris Aselli flavum* (*German*.—Hellblanker Leberthran.) If the livers are running gradually to putrefaction, the oil becomes of a chestnut brown colour—*Oleum jecinoris aselli subfuscoflavum*—(*German*. Braunblanker Thran); and, again, after the oil has been obtained by the above methods, some can still be

¹ See M. Taufflier, in Gazette Médicale de Paris, Août 12, 1837.

² Die neuern Arzneimittel, u. s. w. S. 351.

procured by boiling the livers, which constitutes the *Oleum jecini-noris aselli fuscum*.

EFFECTS ON THE ECONOMY.

The properties of codliver oil are said to be different in the different varieties met with in commerce. The colour varies from a bright yellow to a reddish brown; and the oil is sometimes clear, but, at others, more or less turbid. The bright has the consistence of poppy oil; the brown is thicker. The smell is weaker in the former; in the latter, it resembles that of old salt herrings. The taste of the brown is an empyreumatic bitter; and resembles train oil; is somewhat acrid, and remains for a time on the tongue; that of the clearer oil is much less disagreeable. Litmus paper is feebly reddened by the clear; considerably so by the brown variety. Both sorts are soluble in alcohol and ether.

Codliver oil has long been used as a popular remedy in northern Germany, especially in Westphalia—as well as in Holland and England; but it is only of comparatively late years, that it has attracted the attention of physicians. In England, it appears to have been first recommended by Percival, and in Germany by Schenk.¹ When administered internally, it excites a disagreeable taste in the mouth, and nausea. Yet patients soon become accustomed to it; and Riecke² affirms that he has frequently seen children take it without repugnance. When the nausea is once overcome, the oil does not oppress the stomach, except when it is *embarrassed*, or the digestive powers are greatly enfeebled. Nor does it seem to destroy the appetite by continued use. Yet many persons, especially adults—less so children—according to Kopp, reject it immediately. It is necessary for the digestive powers to be energetic when it has to be given for any length of time. To those, whose digestive organs are very irritable, Kopp recommends that Bourdeaux wine should be taken after it.

Codliver oil has no manifest effect on any of the secretions, except occasionally on the urinary and cutaneous depurations; and on the healthy organism it appears to excite no marked change. In strumous affections, however, its favourable influence is said to be striking, as well as in rachitic, rheumatic, and gouty disorders. In such cases, it is said, by the German writers, to excite powerfully the reproductive or nutritive functions, when administered for a

¹ Hufeland's Journal, lv. 31.

² Op. cit. S. 352.

proper length of time.¹ The favourable effects are, in general, not rapidly exhibited; and to produce a cure, according to Kopp, the remedy must be persisted in for at least four weeks, and commonly for some months.

Kopp suggested, that owing to the similarity of the effects of this oil to those of iodine, its efficacy might be owing to its containing the latter, and some chemical investigations, made by him in the year 1836, confirmed the suggestion.² The quantity is extremely small, but—Kopp supposes—like the steel in chalybeate waters, as the iodine is commingled naturally with the oil, it may exert a much greater effect than if it were added artificially in the like quantity.

As respects its administration in disease, it has been employed—especially in Germany—as a domestic remedy in

1. *Rheumatism*, in which its reputation has been favourable. In the year 1835, Brefeld wrote a monograph on the codliver oil, in which, resting upon numerous indigenous and foreign experiments, he maintained it to be a remedy of great and specific efficacy in every form of chronic and actual rheumatism; and since then his testimony has been corroborated by that of Schenk, Spiritus, Möring, Schütte, Wesener, Osberghaus, Günther, Volkmann, Suttinger, Kopp, Rust, and Moll.³

By many, its use has likewise been advised in gouty affections; but Brefeld esteems it ineffectual in actual gout.

2. *Scrofula and Rickets*.—In these diseases it would seem to be more efficacious than in rheumatism. Brefeld, indeed, asserts that he has found no remedy equal to it, in cases where the osseous tissue is permanently affected,—as in the different shades of rickets, arthrocace, spina ventosa, and caries scrofulosa: next to these, it has been extolled in affections of the chyloferous vessels and internal glands, especially when they present themselves under the chronic form of atrophy. In affections of the external glands, its efficacy was less striking and rapid; and almost null in scrofulous affections of the skin, ophthalmia, discharges from the ear, &c., unless when applied externally, in which cases, as well as in external glandular swellings of a scrofulous character, it was especially useful. The slighter forms of scrofulous eruptions dis-

¹ Riecke, Die neuern Arzneimittel, S. 352.

² Hufeland und Osann's Journal, 1836; Annalen der Pharmacie, xxi und xxii.; and Bulletin Général de Thérapeutique, No. xx. Oct. 30, 1837.

³ Richter's Specielle Therapie, x. 468. Berlin, 1828.

appeared, without any unpleasant sequelæ, by simply smearing them with the oil; the more obstinate forms, by the simultaneous use of appropriate internal agents, of which Brefeld prefers the æthiops antimonialis to all others. Scrofulous inflammation of the eyes disappeared frequently and rapidly by simply smearing the eyelids with the oil.

Kopp extols it in scrofula and rickets, both when internally and externally exhibited; and in porrigo, its external application was found by him to be highly serviceable.

Numerous trials with the remedy by other physicians—as by Schenk, Schütte, Von dem Busch, Gumpert, Fehr, Rösch, Schmidt, Knod von Helmenstreit, Heineken, Münzenthaller, Beckhaus, Spitta, Günther, Roy, Gouzée,¹ Taufflier,² Jüngken,³ and others, confirm its great efficacy in scrofulous and rachitic affections.⁴

Both Kopp and Brefeld recommend it highly in phthisis pulmonalis of strumous origin, occurring especially in youth.

The efficacy, indeed, of the oil in scrofula suggested its administration in cases of—

3. *Tubercles*—and, accordingly, it was exhibited in such cases, by Hankel, whose experiments led him to advise a further trial of it. Riecke⁵ refers to a case of the kind confirming Hankel's observations, which occurred to Dr. Pagenstecher, of Elberfeld; and Richter, of Wiesbaden, Professor Alexander, of Utrecht, and Häser, of Jena;⁶ seem to have experienced equally satisfactory results.

Carron du Villards⁷ extols the codliver oil in *opacities of the cornea*, whether resulting from slight ulceration, or from interlamellar effusion. It is only applicable after the inflammation has disappeared. A drop or two of the oil is then placed on the cornea with a camel's hair pencil. Sometimes even the white oil is too stimulating: it is then necessary to dilute it with oil of sweet almonds: in other cases, the white oil is not sufficiently stimulating: when the brown must be used.

4. *Chronic cutaneous diseases*.—In these affections, codliver oil has been given with advantage by Richter; and it is suggested,

¹ Bulletin Médical Belge, Janvier, 1838, p. 6.

² Gazette Médical de Paris, Août 12, 1837.

³ Lond. Med. Gazette, April 20th, 1839, p. 126.

⁴ Riecke, Op. cit. S. 356.

⁵ Op. cit. S. 356.

⁶ Hufeland's Journal, B. lxxxvi. 1838.

⁷ Bulletin Général de Thérapeutique, Oct. 30, 1835.

that the greater success obtained by him than by Brefeld, may have been owing to his having administered the remedy in much larger doses. Richter's trials were numerous, and were made through a period of three years; they are, therefore, highly deserving of attention. He says;—that the impure, yellowish brown, and odorous oil should be selected, as it is the most active;—that at least six, and never more than ten spoonfuls should be administered daily to adults;—that it must be continued for a long time, as the first traces of a favourable impression are generally somewhat late in presenting themselves,—commonly four weeks, and, in very obstinate cases, later;—so that usually from six to twelve weeks are required for a cure: and, lastly, that the diet must be regulated, and every thing difficult of digestion, flatulent, fatty, strongly salted, or acid, be carefully avoided. In this manner he treats tetters, inveterate itch, and tendency to the formation of boils.

Kopp's experiments agree with those of Richter, as to the internal use of the oil in tetters; he esteems it to act by "improving the humours." He found it, also, of use, in cases of dry tetter, when rubbed on the part. In some troublesome affections of the skin, especially of the hands, conjoining the characters of impetigo, with erysipelatous redness and swelling, and inducing the most severe suffering, Dr. Marshall Hall¹ speedily succeeded in restoring the textures to a healthy condition by the external use of the codliver oil, after all other remedies had been tried fruitlessly. For rhagades and chaps, he says, it is a preventive, and a speedy cure; and it is productive of great benefit in eczema, and other diseases inducing excoriation and fissures of the skin.

5. In cases of *tumours of the mammæ* in young females, Kopp found the oil useful, when administered for some time, conjoined with the application of leeches to the affected part.

6. In the Charité, at Berlin, the oil was given with advantage in *coxarthrocace*, in doses of four ounces every morning;—the mouth being rinsed afterwards with peppermint tea, and a cupful of this tea or of coffee being drunk afterwards.

7. Kopp also affirms, that he cured a case of *chorea* by it, which had supervened on an attack of gout.

¹ Lond. Med. Gazette, Sept. 1832.

METHOD OF ADMINISTERING.

The dose of the codliver oil for an adult is from half a spoonful to three spoonfuls, two or three times a day. To children, it is given by tea-spoonfuls. Its unpleasant taste can scarcely be corrected by admixture with other agents; for which reason, many prefer to give it in the pure state, taking afterwards some peppermint lozenges. It is also recommended to be given united with coffee, or with lemon juice, or in the form of emulsion. Kopp prescribes it in the pure state, advising that the mouth should be rinsed with water, and that some dry bread should be eaten after it.

Mistura Olei Jecinoris Aselli.

Mixture of Codliver Oil.

- ℞. Ol. jecinor. asell. ℥j.
 Solut. potass. carb. ℥ij.
 Ol. volat. calami aromat. gtt. iij.
 Syrup. cort. aurant. ℥j. M.

Dose.—One or two tea-spoonfuls, morning and evening, in cases of rickets. FEHR.

- ℞. Ol. jecinor. aselli,
 Syrup. cort. aurant.
 Aquæ anisi, aa. ℥j.
 Ol. calam. aromat. gtt. iij. M.

Dose.—A spoonful morning, noon, and night; in gouty swellings, rickets, &c. RÖSCH.

Emulsio Olei Jecinoris Aselli.

Emulsion of Codliver Oil.

- ℞. Ol. jecinor. asell. alb.
 Vin. hungaric. (vel malag-) aa. ℥iv.
 Gum. arab. ℥j.
 Fiat emulsio, cui adde
 Syrup. cort. aurant. ℥j.
 Elæosacchar. menth. pip. ℥ij.¹

Dose.—Two table-spoonfuls, two or three times a day; shaking the mixture. BREFELD.

¹ The *elæosaccharum* or *oleosaccharum menthæ piperitæ* is officinal in the pharmacopœias of Austria, Denmark, Hanover, Oldenburg, Prussia, &c. It is made by triturating eight drops of the essential oil of peppermint with an ounce of sugar.

Syrupus Olei Jecinatoris Aselli.

Syrup of Codliver Oil.

- ℞. Ol. jecinator. aselli, ℥viiij.
 Gum. arab. pulv. ℥v.
 Aquæ, ℥xij.
 Syrup. commun. ℥iv.
 Sacchar. albiss. ℥xxiv.

Make an emulsion of the four first ingredients; dissolve the sugar at a moderate heat; clarify, and add

Aq. flor. aurant. ℥ij.

DUCLOU.¹

Linimentum Olei Jecinatoris Aselli.

Liniment of Codliver Oil.

- ℞. Ol. jecinator. aselli, ℥ss.
 Plumbi acetat. ℥ij.
 Vitell. ovor. (seu adipis,) ℥iiij. M.

For external use in cases of ulcers, fistulæ, &c.

OLEUM SINAPIS.

SYNONYMES.—Oleum Æthereum seu Volatile Seminum Sinapis, Oil of Mustard Seed.

French.—Huile Volatile de Moutard.

German.—Ætherisches Senföl.

This preparation has been recently recommended to the notice of practitioners in Germany, by Dr. Meyer, of Minden, especially; at whose suggestion, numerous experiments were made with it at the Charité, in Berlin, the favourable results of which have been published by Dr. Wolff.²

METHOD OF PREPARING.

M. Fauré, in France, and M. Hesse, in Germany, found that if bruised mustard seed be placed in a still with cold water, much more essential oil is obtained than if hot water or steam had been

¹ Journal de Pharmacie, Sept. 1837.

² Schmidt's Jahrbucher, 1837.

employed at once. M. Hesse, indeed, advises, that the seed should be macerated with cold water for several hours before the distillation is commenced. It would seem, too, that acids, alcohol, &c. exercise the same influence in preventing the development of the oil.

EFFECTS ON THE ECONOMY IN HEALTH.

The volatile oil of mustard is of a yellowish white colour. It exhales so strong a smell of mustard, that the attempt to test its odour instantaneously excites a violent pungent sensation in the nose, and tears in the eyes. Its acidity is so great, that its application to the sound skin immediately occasions a sense of burning, and intense redness and vesication on the parts with which it comes in contact.

EFFECTS ON THE ECONOMY IN DISEASE.

Mustard seed oil may be applied either externally or internally. For the first object, Dr. Meyer advises a solution in rectified spirit (twenty-four drops to the ounce), or in oil of almonds (five or six drops to the dram of oil of almonds). In Berlin, the first of these is used. Even this solution exhales so strongly the characteristic odour of the mustard, that simply smelling it induces a sense of pungency in the nose, as well as tears in the eyes. Owing to the great volatility of this oil, its properties and efficacy are soon lost; and the strength of the spirituous solution becomes less and less, when the fluid is preserved for a long time in vessels that are not accurately closed, or are frequently opened for the administration of the remedy and afterwards not carefully attended to. It is therefore advisable in practice, that only small quantities should be prescribed at a time, and that these should be kept in well-closed vials, and in a cool place.

The mode of external administration may be one of two—according to the sensibility of the skin, and the effect it may be desirable to induce. It may consist either in rubbing the liquid on a part of the surface, or in applying strips of linen wetted with the solution. The first method is advisable where the skin is delicate—as in the case of women and children, and in those whose healthy sensibility has not been diminished—as by paralytic affections. The fluid, when rubbed on the skin, very quickly evaporates, in the course of a few minutes, and excites a vivid sensation of burn-

ing, with bright redness of the surface, which disappears in the course of a few hours, at the farthest.

The augmented sensibility, produced by friction with the solution of the oil, continues generally for a longer period; and, consequently, if a fresh application be needed at a short interval—say in from four to six hours—it must be made on the neighbouring parts, avoiding those first implicated. It is sufficient to use the remedy in this manner two or three times a day.

The application of the oil by means of strips of linen is adapted for skins such as those of men, which are thicker, and less sensible, as well as for morbid cases in which the healthy sensibility has been depressed. The size and shape of the strips must be determined by circumstances. The linen is dipped in the solution, placed upon the prescribed portion of the skin, and suffered to dry, which generally happens in about eight minutes. Burning pain immediately succeeds the application, and is often so insupportable that the patients object to wait until the linen is dry, and it has to be removed earlier. Beside the more violent pain, produced by this mode of applying the oil, the redness of the skin is much greater, and in many cases vesication succeeds.

If the application be made twice a day, morning and evening, this is sufficient for the treatment of chronic diseases; but the same part of the surface cannot be rubbed on the same day, on account of the severe pain and vesication, which would be induced.

This method of applying the oil is considered to be especially proper in the case of the trunk and the extremities; whilst the first method is generally to be preferred, where it is desirable to use it upon the face, behind the ears, or on the neck.

The oleum sinapis is indicated, wherever a counter-irritant or local excitant is demanded. Riecke¹ advises it in chronic cases unaccompanied by fever, as well as in light febrile affections, where a gentle excitant may be needed; and in such fevers as are conjoined with a torpid state of the system, and which require the use of excitants. He regards its powerfully excitant action as constituting it a most useful article in our lists of antagonising or derivative, as well as of excitant agents. In the first relation, Wolff employed it with advantage both in subinflammatory diseases, and in nervous affections not of an inflammatory character—as in subacute rheumatism of the joints, aponeuroses and muscles, and in chronic rheumatism of those parts, where blisters would be ser-

¹ Die neuern Arzneimittel, S. 341.

viceable, and for which it may be substituted with advantage, in consequence of its not being attended with the inconveniences occasionally produced by the latter on the urinary organs. He employed it, likewise, in rheumatic neuralgiæ,—otalgia, odontalgia, prosopalgia, and ischias,—bloodletting being prescribed, or not, according to circumstances; and also as a palliative agent in chronic neuralgia, in colic of the hysterical kind, and in gastrodynia.

As an excitant, to arouse the vital activity in debilitated parts, Wolff used the solution of the oil in paralysis, in the sequelæ of protracted rheumatism, and in neuralgia, which was probably the result of exudation into the neurilema, &c. He gave it also internally several times with good effect, in disorder of the stomach, (*Verschleimung des Magens*,) accompanied by too great a secretion of mucus, and producing complete loss of appetite. Two drops of the *oleum sinapis* were formed into a mixture of six ounces, by the aid of gum arabic and sugar; and of this a table-spoonful was given every two hours.

In cases of atonic dropsy, it has been conceived, that advantage might, in many cases, be derived from the internal use of this volatile oil; as in the majority of those to whom it was given internally, the urinary secretion was largely augmented by it.¹ Kuhn,² indeed exhibited it in a case of atonic dropsy as a sequel of intermittent fever with signal benefit.

The *oleum sinapis* has already been received into the Hamburg Pharmacopœia.

PHLORIDZINA.³

SYNONYME—Phloridzinum, Phloridzine.

German.—Phloridzin.

This bitter principle exists in the bark of both the trunk and the roots of the apple, pear, cherry, and plum tree.

METHOD OF PREPARING.

The following plan is recommended by M. de Koninck:—

¹ Riecke, *Op. cit.* S. 343.

² *Medicinische Zeitung*, No. 38. Sep. 21, 1836, S. 191.

³ From *Φλωος*, inner bark, and *ῥίζα*, root.

The fresh bark of the root of the apple-tree is to be boiled for two hours with sufficient water to cover the bark : the decoction is to be decanted, and a second one made by the addition of more water. On uniting the two decoctions, and permitting them to stand for twenty-four hours, a deposition of phloridzine, in granular crystals, takes place. These are to be treated with distilled water and animal charcoal to purify them. An additional quantity is obtained by evaporating the mother waters to one-fifth. At this degree of concentration, all the phloridzine is deposited. This method affords about one part in three hundred. Another plan yields five per cent. It consists in digesting the fresh root in weak alcohol, at a temperature of 120° , for about eight or ten hours, distilling off the greater part of the alcohol, and crystallising the residue.¹

Phloridzine crystallises in silky spicula of a dead white colour when in masses, or in long slender prisms or tables when crystallised with care. One thousand parts of water, at a temperature from 32° to 71° , only dissolve about one part ; but at from 71° to 212° water dissolves it in all proportions. It is also very soluble in pure alcohol at ordinary temperatures, although but slightly so in ether, even when boiling. It has no action on test papers. S. g. 1.429.

EFFECTS ON THE ECONOMY IN DISEASE.

M. de Koninck found, that from ten to fourteen grains given for a dose, with a dram of sugar, produced the most marked effect on intermittent fever, where quinine had failed. In four cases reported by Dr. Van Mons,² of Bruxelles, the disease was arrested by the first sixteen grains ; other cases required sixteen grains a few hours before the first paroxysm ; twelve grains before the second ; six before the third ; and four before the fourth. Five successful cases are likewise given by M. Mathysen,³ élève interne at the Hospital St. Pierre, Bruxelles ; yet M. Leonhard⁴ is satisfied, from his various trials, that phloridzine does not possess any febrifuge virtue !

METHOD OF PRESCRIBING.

It may be given in the form of pill or of powder, like the qui-

¹ Journal de Pharmacie, & Amer. Journ. of Pharmac. vol. ii. new series, p. 240. See, also, M. Boullier, in Gazette Médicale de Paris, 17 Juin, 1837.

² Bulletin Médical Belge, Mai, 1836.

³ Ibid. Oct. 1835.

⁴ Encyclographie des Sciences Médicales, Mai, 1838.

nine. It was administered at the hospital at Bruxelles, in one case, in the way of *lavement*;—twenty-four grains being given in three lavemens. The paroxysm returned, but was less violent. In two days afterwards, the same quantity was administered in the same manner, and the fever did not recur.

PIPERINA.

SYNONYMES.—Piperinum, Piperine.

German.—Piperin, Pfefferstoff.

This substance was discovered by M. Oerstädt, in the year 1819, in the black pepper, (*Piper nigrum*.¹) It is found, also, in the *Piper longum*, and it has been presumed to be the same, or an analogous principle with the *cubebine* of the *Piper cubeba*. M. Oerstädt at first regarded it as a vegetable alkali, but M. Pelletier subsequently analysed it, and proved it not to be such, but to bear a considerable analogy to resins, and to be of a peculiar nature.²

Piperine has not been much used, except in Italy: it has been highly extolled there in the cure of intermittents, by Meli³ and many others.

METHOD OF PREPARING.

Let two pounds of black pepper, bruised, be digested, at a gentle heat, in three pounds of alcohol, at 36° (.837). This mixture must afterwards be raised to ebullition, then suffered to remain at rest, and grow cold; when it must be decanted, and the operation be repeated with fresh alcohol. The two solutions must then be mixed together, and two pounds of distilled water and three ounces of muriatic acid be added thereto. The liquor becomes turbid, and a precipitate, of a deep gray colour, is thrown down, which is composed, in a great measure, of fatty matter. The deposit being separated, crystals may be collected on the filter and sides of the

¹ Journal de Physique, No. 2, 1820, & Gazette de Santé, Mai 25, 1820.

² Examen chimique du Poivre, par J. Pelletier, Svo. Paris.

³ Annali Univers. di Medicina, xxvii. 161, & xxviii. 22.

vessel. These are the piperine. On adding water until the liquid is no longer rendered turbid, a fresh quantity is obtained.

The above process, which is that of Meli, is the same as one described by M. Pelletier. He has likewise procured it by the following method:—After having exhausted the pepper by alcohol, and evaporated the alcoholic tinctures, a fatty or resinous matter is obtained: this must be subjected to the action of boiling water, which must be added again and again, until it passes off colourless. By dissolving this fatty matter—thus purified by washing in alcohol—by the aid of heat, and leaving the solution to itself for some days, a multitude of crystals are obtained, which may be purified by solution in alcohol and ether, and by repeated crystallisation. The alcoholic mother waters, left to themselves, will furnish fresh crystals. This crystalline matter is piperine.

Piperine presents itself in the form of four-sided prisms, two of which—parallel to each other—are evidently broader than the others. In the pure state, it is of a white colour, and translucent; it is frequently, however, coloured yellow by portions of resin being combined with it. It is inodorous, and of a feeble taste of pepper; fuses readily by heat; is not volatile, and is scarcely soluble in cold water, but somewhat more so in hot. In respect to its solubility in alcohol, testimony is discordant. According to Magendie, it dissolves very readily therein; according to C. G. Gmelin, it is soluble only in small quantity in cold, but in tolerable proportion in hot alcohol, as well as in ether and in the volatile oils.

The solutions taste acrid and peppery, and do not react on vegetable colours;—which shows that it is not an alkaloid, as the discoverer conceived. With acids, it forms no intimate chemical combinations; acetic acid, indeed, dissolves it in considerable quantity, but it is in great part precipitated by water, and by evaporation the whole of the acid escapes.

EFFECTS ON THE ECONOMY.

Piperine—as has already been remarked—has been exhibited chiefly by the Italian physicians for the cure of intermittent fever. Its employment was, doubtless, suggested by the use of pepper corns as a popular remedy in that disease. According to Riecke,¹ the antiperiodic virtue of pepper is exhibited upon the healthy

¹ Die neuern Arzneimittel, S. 361.

economy; a few pepper corns taken before the expected appearance of the menses, arrests them for several days. Of this, he himself has had no experience; but he affirms that the females, in a district of southern Germany, have great confidence in their virtues.

Meli,¹ who treated many cases of intermittent with piperine, considers it as the best of all febrifuges, the quinine not excepted. He forms twenty grains into ten pills, and gives these at intervals during the apyrexia. The efficacy of the *oleum acre piperis* in the same complaint, he ascribes to the piperine it contains.

The febrifuge virtue of piperine has been confirmed by many other Italian physicians; by Brandolini, Bertini, Gordini, Torelli, and others. According to Brandolini, from forty to fifty grains are generally required to effect a cure. Bertini gave it in three doses during the apyrexia, to the extent of a scruple, made into pills with a bitter extract: after two or three doses, the fever was generally arrested. Gordini affirms, that relapses occurred less frequently after the use of piperine than after that of the sulphate of quinine. On the other hand, in the hospital at Turin, Christin was disappointed in it, and such seems to have been the result of the trials made by Chiappa.² In the year 1823, he administered it in ten or twelve cases, but was unable to detect any great antiperiodic property; not more than a fourth part of the sick experienced benefit, whilst, on the others, the cinchona acted like a charm. In general, a burning sensation was experienced in the stomach after taking it, as well as in the throat, with the same kind of feeling occasionally in the rectum, and in the whole abdomen; and in two young individuals, the eyes were made red, and the eye-lids, nose, and lips were swollen.

Piperine has, likewise, been employed by others besides the Italian physicians. Dr. Blom, of Utrecht, has given it in intermittents, but not with as much success as the quinine. According to him, the remedy, soon after it is taken, particularly in very impressible persons, occasions a sense of internal heat, especially in the epigastric region, and not unfrequently it causes perspiration, especially on the upper lip. Blom is, however, doubtful, whether these effects are ascribable to the piperine, or to a portion of the resin of the pepper remaining united with it. He is of opinion,

¹ Nuove Esperienze, &c., Milan. 1823, 8vo., & Annali Universali di Medicina, xxvii. 161, and xxviii. 22.

² Riecke, Op. cit. S. 361.

that both in general debility, and in debility of the digestive apparatus, piperine merits a preference over the sulphate of quinine, both because it can be better borne by the stomach, and because it acts more tonically upon it.

In inflammatory intermittents, as well as in those with gastric complications, the piperine is to be avoided.

Magendie suggests that it should be given in blennorrhœa, in place of the cubebs.

METHOD OF ADMINISTERING.

Pilulæ Piperinæ.

Pills of Piperine.

℞. Piperin. gr. xij.

Extract. gentian. q. s. ut fiant pilulæ xij.

Dose.—One every hour during the apyrexia of fever.

PLATINUM.

SYNONYME.—Platina.

The *Preparations of Platinum* are not given here, as they are not used. According to Magendie, they possess analogous properties to those of the salts of gold. See *Auri Præparata*.

PLUMBI IODIDUM.

SYNONYMES.—Plumbi Ioduretum, Iodide or Ioduret of Lead.

French.—Iodure de Plomb.

German.—Bleiiodid.

MODE OF PREPARING.

This preparation may be made by adding a solution of one hundred parts of hydriodate of potassa to a solution of seventy-five parts of the acetate of lead.

The iodide is a fine yellow powder, insoluble in cold, but perfectly soluble in boiling water, from which it is precipitated, on cooling, in hexagonal plates, partially soluble in alcohol and acetic acid.

EFFECTS ON THE ECONOMY.

The iodide of lead is not an irritant, when applied even to a denuded surface.¹ M. Paton² administered twelve grains of it to a cat of moderate size. In four hours the animal did not appear to experience any inconvenience; twelve more grains were then given; in twelve hours the animal became uneasy, and constantly refused every kind of food. It appeared to suffer in the kidneys; subsequently, it was attacked with violent colic, which caused it to jump to great heights. Three days after taking the iodide, it died, suffering dreadfully. The dissection was made twelve hours afterwards, when no traces of irritation were perceptible. M. Paton examined the interior of the stomach chemically, but was unable to detect any of the iodide, nor could any portion of it be discovered in the fæces. He then boiled the intestines and their contained matters in distilled water; the liquid was filtered and decolourised by charcoal, but no effect was induced by the tests for lead. The matter remaining on the filter was digested in dilute nitric acid: the solution was filtered, and a precipitate obtained on pouring in a solution of chromate of potassa. The liquid was evaporated; the residue calcined along with what was left by the evaporation of the water, and the whole brought in contact with dilute nitric acid. Nitrous gas was disengaged, and the solution responded to reagents like the solutions of the salts of lead. M. Paton infers, that the iodide of lead introduced into the stomach is partly absorbed, and that it is this portion which causes death,—the remainder passing into the intestines, and admitting of detection by the method described.

When given internally, in the dose of a quarter or half a grain, Velpeau thought that it occasioned, in one instance, irritation in the alimentary canal; but Dr. O'Shaughnessy thinks that this result must have been owing to idiosyncrasy, as ten grain doses can be

¹ Eager, in *Dublin Journal* for 1834.

² *British Annals of Medicine*, Mar. 3, 1837; and *Journal de Chimie Médical*, Jan. 1837.

borne with perfect impunity. The experiments of Dr. Cogswell¹ show, that it is by no means an active agent.

Owing to its not exciting cutaneous irritation—like iodine, and the iodide of potassium—the iodide of lead has been applied externally. Velpeau² treated three cases of enlarged glands with very gratifying success, although the patients had used frictions with other preparations of iodine ineffectually. Similar good effects were observed by Guersent, Roots, and others.

Unguentum Plumbi Iodidi. (Pharm. Lond.)

Ointment of Iodide of Lead.

℞. Plumbi iodid. ℥j.

Adipis, ℥viij. M.

Applied to scrofulous and other indolent swellings in the way of friction.

PLUMBI TANNAS.

SYNONYMES.—Tannate of Lead.

French.—Tannate de Plomb.

German.—Gerbstoff blei.

Autenrieth³ has strongly recommended the tannate of lead in cases of *paratrimma ad decubitum*, that is, of sores produced by lying, and its advantages have been confirmed by others.

METHOD OF PREPARING.

The tannate is formed by precipitating an infusion of oak bark by acetate of lead, according to the following formula.

℞. Cortic. querc. gross. pulv. ℥j.

Coque cum

Aquæ commun. ℥viij.

Ad colaturæ ℥iv. admisce acetum plumbicum quamdiu præcipitatum inde oritur. Liquor filtretur per chartam bibulam. Præcipitatum in charta remanens ad consistentiam unguenti tenuioris exsicca.⁴

¹ Essay on Iodine, p. 142. Edinb. 1837.

² Lugol, Essays on Iodine, &c., by O'Shaughnessy, p. 206.

³ British Annals of Medicine, June 2, 1837; and Journ. de Chimie Médicale, Mars, 1837.

⁴ "Take of oak bark, in coarse powder, an ounce; boil in eight ounces of

The ointment is used, spread upon lint, three times a day.

More recently, Dr. Tott has recommended the ointment in cases of *decubitus gangrænosus*, or sloughing sores produced by lying.¹ In one case, in which it appeared to be inefficacious, he took two drams of the dried precipitate, mixed it with an ounce of unguentum rosatum, and applied this *unguentum plumbico-tannicum* with success.

POTASSÆ CHLORAS.

SYNONYMES.—Kali Chloricum, Chloras Kalicus Depuratus, Alkali Vegetabile Salito-dephlogisticatum, Chloruretum Potassæ Oxidatum, Haloidum Oxygenatum, Murias Potassæ Hyperoxygenatum seu Oxygenatum, Oxygenochloruretum Potassii, Potassæ Euchloras, Chlorate of Potassa, Chlorate of Protoxide of Potassium.

French.—Chlorate de Potasse.

German.—Chlorsaures Kali.

METHOD OF PREPARING.

In the chemical manufactories, the chlorate of potassa is prepared by passing chlorine gas into a solution of carbonate of potassa. In this way, chlorate of potassa is obtained mixed with more or less muriate of potassa. The salt prepared in the laboratories, before it is adapted for medical use, should be purified by recrystallisation. It is to be observed, that when the adequate quantity of chlorine gas is not employed in the preparation, the resulting compound is analogous to the chlorides of soda and lime, and in action it agrees rather with those preparations than with the true chlorate of potassa. This may tend to explain the discrepancy in the experience of different physicians.

The chlorate of potassa crystallises in white leaves, having the splendour of mother of pearl, or in four or six-sided tables, having a

water, until, when strained, four ounces remain: add acetate of lead as long as any precipitate falls: filter the liquor through bibulous paper, and dry the precipitate remaining on the paper to the consistence of a thin ointment.”

¹ Gräfe und Walther's Journal der Chirurgie, B. xxiv. S. 676, Berlin, 1836; and Gazette Médicale, Jan. 1837.

specific gravity of 1.989. It is permanent in the air, and has a cool, saline, disagreeable taste, similar to that of saltpetre. Six parts are soluble, at the ordinary temperature, in 100 parts of water. When exposed to heat oxygen escapes, and chloride of sodium remains. When beaten forcibly in a mortar, it crackles, emits light, and sparks. When rubbed lightly with inflammable substances, or when struck, it inflames readily, and hence its well known employment in the formation of matches.

EFFECTS ON THE ECONOMY.

These have not been completely tested, in the opinion of some at least.¹ L. W. Sachs, who has frequently administered it, is of opinion, that in the chlorate of potassa the direct effect of the alkali is rendered milder by the chloric acid, whilst the alkali modifies that of the acid; in this manner, the caustic property of the alkali is destroyed; whilst the liquifying or resolvent (*fluidisirende*) property is moderated, but not removed. On the other hand, by the union of the chloric acid with the alkali, the powerful excitant action on the nerves, which the former exerts, is at the same time markedly moderated, although certainly not destroyed; the mode in which it is exerted, he thinks, is probably changed.

By such a union, a medicine has been supposed to be formed, which acts chiefly on the nervous system, and which is capable of mitigating and probably of removing any morbid erethism therein, with the hyperæsthesia thereby induced.

Such is the opinion of certain therapeutists. Others imagine, that it is capable of purifying the mass of blood in consequence of the chlorine which it contains; but a salt of chloric acid is not possessed of the same properties as chlorine; and, accordingly, when we have found occasion to administer it, we have never witnessed any of the effects ascribed to it; nor have we seen any evidence of the *modus operandi* on the nervous system mentioned above, or of its imparting oxygen to the blood as supposed by some.²

From its excitant properties, and under the notion that it may act upon the blood, and through the blood on the functions of nutrition as an excellent alterative, the chlorate of potassa has been recommended in chronic cutaneous diseases in general, as well as

¹ Riecke, *Die neuern Arzneimittel*, S. 300.

² See Stevens on the Blood, p. 296. London, 1832.

in hepatic and syphilitic affections. It has also been occasionally administered in cases of chronic asthenia.

Köhler¹ employed it in several cases of tubercular phthisis, and although the general results of his experiments were unfavourable, he thinks it ought to be admitted into the number of those remedies that are useful in phthisis, although its stimulating action on the circulating and pulmonary systems cannot be denied. Its use is contra-indicated where the fever runs high, and where there is any sign of inflammation of the lungs, or tendency to hæmoptysis.

Sachs, in accordance with the views before mentioned, in regard to its antineuropathic properties, has advised it in cases of prosopalgia. He affirms, that in a great many instances it afforded essential relief. Chisholm appears to have been one of the earliest to prescribe it in neuralgia faciei; and, after him, Herber, and subsequently, B. Schäffer, Jos. Frank, Meyer, and others, employed it both as a curative and palliative agent in that disease.

Recently, it has been advised in obstinate rheumatism of the nervous kind, by Knod von Helmenstreit; and Eyr has extolled it in ulceration of the mouth after violent salivation.

Sachs administered it in the dose of from three to six grains, three or four times a day, but some give it in a much larger quantity. It may be administered either in the form of powder or of solution.

Solutio Potassæ Chloratis.

Solution of Chlorate of Potassa.

SYNONYMES.—Solutio Muriatis Potassæ Oxygenati, Liquor ad Ulcera Atonica.

℞. Potassæ chlorat. ℥j.

Aquæ destillat. ℥xij. M.

To be applied to indolent ulcers, by means of lint dipped in it, or of a camel's hair pencil, to excite the tissues.

SWEDIAUR.²

Potus Potassæ Chloratis.

Drink of Chlorate of Potassa.

SYNONYMES.—Potus Oxygenatus. (*French*.—Tisane Oxygénée.)

℞. Solut. potass. chlorat. ℥ij.

Aquæ, ℥iv. M.

Given internally, in cases of general asthenia.

Dose.—One or two pints a day.

SWEDIAUR.

¹ Rust's Magazin, B. xlv.

² Pharm. Med. Pract. Bruxelles, 1817. 2de édit.

Mistura Potassæ Chloratis.

Mixture of Chlorate of Potassa.

- ℞. Potassæ chlorat. ʒiiss.
Aquæ destill. simpl. ʒiv.

Solve.

Dose.—A spoonful every two hours. HELMENSTREIT.

Eyr dissolves twenty-five grains of the chlorate of potassa in four ounces of distilled water, and administers a spoonful three times a day.

- ℞. Potass. chlorat. ʒj.
Aquæ destillat. ʒiv.
Syrup. althææ, ʒj. M.

Dose.—A table-spoonful four times a day. KOEHLER.

POTASSII BROMIDUM.

SYNONYMES.—Kalium Bromatum, Bromide of Potassium. In Solution Hydrobromate of Potassa, Potassæ Hydrobromas, Kali Hydrobromicum.
French.—Bromure de Potasse.
German.—Bromkalium, Kaliumbromid, Bromwasserstoffsäures Kali.

METHOD OF PREPARING.

According to Liebig, this preparation can be readily made by dissolving bromine in spirit of wine, and adding caustic alkali until the spirit begins to change colour, then evaporating and heating to redness. In the London Pharmacopœia, the bromide is directed to be made by adding first an ounce of iron filings, and afterwards two ounces of bromine to a pint and a half of distilled water. The mixture is set aside for half an hour, and frequently stirred with a spatula: a gentle heat is then applied, and when a greenish colour is produced, two ounces and a dram of carbonate of potassa, dissolved in a pint and a half of water, are poured in: what remains is filtered and washed with two pints of boiling distilled water, and again filtered. The mixed solutions are then evaporated, that crystals may form.

Liebig says it crystallises in four-sided shining tables; according to Balard,¹ commonly in tubes, and at times in long rectangular

¹ Annales de Chimie, tom. xxxii.

parallelopipedons. It has a pungent taste. By heat it crepitates, and melts into a red hot flux, without experiencing change. It is more soluble in hot than in cold water; producing, during its solution, evident cold, and becoming converted into hydrobromate of potassa. It is also soluble in alcohol, although in small quantity. The solution of hydrobromate of potassa dissolves no more bromine than pure water.

EFFECTS ON THE ECONOMY.

The bromide of potassium excites the same phenomena as bromine, but with less intensity. From one dram and a half to ʒij is needed to kill a dog. The animal appears to suffer; is restless, and gradually falls into a state of prostration. In smaller doses it appears to act powerfully on the human stomach. The bromide, like bromine, seems first to have been applied to therapeutical purposes by Pourché.¹ Two cases of scrofulous tumours are reported by him to have been removed by friction with an ointment composed thereof, and a cataplasm sprinkled with an aqueous solution of it. In a third patient, chronic otorrhœa and scrofulous tumefaction of the testicle yielded to the same agency, combined with the internal use of bromine. A very large goître was reduced two thirds by it.

Pourché prescribed the bromide internally in the form of pill, in the dose of four to eight grains in the day.

Magendie² employed the preparations of bromine in scrofula, in amenorrhœa, and in hypertrophy of the ventricles of the heart. Prieger recommended an ointment of the "*Kali bromicum*" in inveterate porrigo favosa as well as in obstinate and malignant tetter, and with good success; and Dr. Williams³ in cases of enlarged spleen. The last gentleman suggests, that it possesses "unusual, if not specific powers in the cure of diseases of the spleen!" It was owing to these results that the bromide was introduced into the London Pharmacopœia of 1836.⁴ Dr. Williams also gave it with success in a case of ascites.

¹ Journ. de Chimie Médicale, iv. 594; see, also, Bulletin Général de Thérapeutique, No. 14, Juillet, 30, 1837.

² Formulaire, Ed. cit.

³ Elements of Medicine, i. 338.

⁴ Pereira, Elements of Materia Medica, Pt. i. p. 287. Lond. 1839; and Brande's Dict. of Mat. Med. p. 126. Lond. 1839.

MODE OF ADMINISTERING.

Solutio Potassii Bromidi.

Solution of Bromide of Potassium.

℞. Potassii bromidi, gr. xvij.
 Aquæ lactucæ destillat. ℥iij.
 Syrup. althææ, ℥j. M.

To be given in the course of the twenty-four hours: in table-spoonfuls.

MAGENDIE.

Unguentum Potassii Bromidi.

Ointment of Bromide of Potassium.

℞. Adipis, ℥j.
 Kalii bromat. gr. xxxvj. M.

Half a dram to a dram to be rubbed on scrofulous swellings.

MAGENDIE.

M. Pourché employs ℥j of the bromide to the ounce of lard.

℞. Axung. ℥j.
 Potassii bromid. gr. xxiv.
 Bromini liquid. gr. vi ad xij. M.

MAGENDIE.

POTASSII CYANIDUM.

SYNONYMES.—Potassii Cyanuretum, Cyanide, or Cyanuret of Potassium.

French.—Cyanure de Potassium.

German.—Cyankalium.

This preparation was proposed by MM. Robiquet and Villermé,¹ as a substitute for the hydrocyanic acid. It is, in their opinion, far more certain in its effects than that preparation.

METHOD OF PREPARING.

The cyanide of potassium is formed whenever potassa is calcined with an animal matter, as in the preparation of the Prussian blue. It is commonly prepared, after the process of Robiquet, by exposing to long continued heat the ferruginous prussiate of po-

¹ Bulletin de la Société Médicale d'Emulation, Juillet, 1823.

tassa. The cyanuret of iron is completely decomposed, and that of the potassium remains. The residuum, after this strong calcination, constitutes a solid, blackish mass, which consists wholly of the cyanide of potassium, soiled by the iron and the charcoal belonging to the cyanuret of iron. The mass is dissolved in water, when the iron and charcoal are deposited; whilst the cyanide of potassium dissolves, and is transformed into hydrocyanate of potassa.

When the process has been well conducted, the solution is perfectly colourless, and retains no portion of iron. M. Chevallier¹ considers this process to be impracticable, as the cyanide decomposes water on coming in contact with it. The result, therefore, must be hydrocyanate of potassa; and, on heating this, all the hydrocyanic acid escapes, and the residue is merely potassa. He prepares the salt by calcining the ferro-hydrocyanate of potassa, and then separating the cyanide from the quadricarburet of iron by pure alcohol: on distilling this, the cyanide is obtained very pure.

Pure cyanide of potassium is white and transparent; it may be fused in the fire without being decomposed, and keeps for an indefinite period, provided it be kept dry.

EFFECTS ON THE ECONOMY.

MM. Robiquet and Villermé performed some experiments on animals in the presence of Magendie.² A tenth of a grain destroyed a male linnet in a minute; less than a grain killed a guinea pig in two or three minutes: a small drop of the hydrocyanate of potassa, containing only the hundredth part of a grain of the cyanide in solution, caused a linnet to drop down dead in half a minute. Half a dram, containing five grains of the cyanide, killed a dog of large size in a quarter of an hour.

Magendie proposes, that the cyanide of potassium should be dissolved in eight times its weight of distilled water, when it becomes transformed into hydrocyanate of potassa. To this solution, he gives the name *medicinal hydrocyanate of potassa*, and advises, that it should be given under the same circumstances, and in the

¹ Journ. de Chimie Médicale, and Journal of Phila. College of Pharmacy, 1832.

² Formulaire pour la Préparation &c. de plusieurs Nouveaux Médicaments, &c.

same doses, as the *medicinal hydrocyanic acid*, (see page 3.) He farther suggests, that, to render it wholly independent of the action of the small portion of alkali contained in the cyanide, a few drops of some vegetable acid may be added, or it may be prescribed with an acid syrup.

The dose of the cyanide is a quarter of a grain at first, gradually increased to a grain and more. M. Bally gave it to fifty-two individuals labouring under different diseases; it produced no effect on thirty-five; and, on the others, the result was neither constant nor salutary, so that he is not inclined to place more reliance upon the cyanide than upon the hydrocyanic acid.

By Dr. Lombard,¹ of Geneva, it has been applied externally, with success, in some cases of facial neuralgia. He uses it by friction, in the form of watery solution, or of ointment, according to circumstances. The watery solution is in the strength of from one to four grains to the ounce of water; and the ointment is composed of from two to four grains of the cyanide to an ounce of lard. The aqueous solution, however, is considered by Dr. Lombard to be the most prompt in its effects. Dr. Lombard regards the cyanide to be contra-indicated, where the nervous affection is complicated with inflammatory action. He has found it, also, a useful remedy in chronic rheumatism. In sciatic neuralgia, it was not successful. In white swelling, attended with acute pains, poultices moistened with the solution, gave great relief. Dr. Lombard, indeed, affirms, that the soothing properties of the cyanide are superior to those of any remedy known. Lotions of hydrocyanic acid are not to be compared with it,—the acid being decomposed with facility, and not devoid of danger.

MM. Trousseau and Rullier² also recommend the cyanide, in the proportion of four grains to an ounce of water, as a local application in various forms of neuralgia.

M. Andral³ employed the cyanide with complete success in a case of most intense cephalalgia, which, for ten months, had resisted the most powerful remedies, as bleeding, a seton in the neck, blisters and sinapisms. It was employed in solution, in the proportion of from six to eight grains to the ounce of distilled water; and compresses, wet with the solution, were applied, for eight days, to the forehead and temples.

¹ Gazette des Hôpitaux, & Lond. Med. Gaz. Sept. 1831.

² Lond. Med. and Surgical Journ. Dec. 15, 1832; and Amer. Journ. of the Med. Sciences, May, 1833, p. 238.

³ Gazette Médicale, Jan. 1832.

MODE OF ADMINISTERING.

Mistura Potassii Cyanidi.

Mixture of Cyanide of Potassium or of Hydrocyanate of Potassa.

(Pectoral Mixture, of Magendie.)

- ℞. Potass. hydrocyan. med. ℥j.
 Aquæ destillat. Oj.
 Sacchar. purif. ℥iss. M.

Dose.—About five drams (a table-spoonful) night and morning.

(Pectoral Potion.)

- ℞. Potass. hydrocyan. med. gtt. xv.
 Infus. hederi terrestr. ℥ij.
 Syrup. althææ, ℥j. M.

Dose.—Five *grammes* (a tea-spoonful) every three hours.

MAGENDIE.

- ℞. Potassii cyanid. gr. ½.
 Aquæ lactucæ, ℥ij.
 Syrup. althææ, ℥j. M.

Dose.—Five drams (a table-spoonful) every two hours.

MAGENDIE.

Syrupus Potassæ Hydrocyanatis.

Syrup of Hydrocyanate of Potassa.

- ℞. Potass. hydrocyanat. medic. ℥j.
 Syrupi, ℥j.

This syrup may be added to pectoral draughts, and may be substituted for other syrups.

Pilulæ Potassii Cyanidi.

Pills of Cyanide of Potassium.

- ℞. Potassii cyanid.
 Amyli, aa. gr. iv.
 Syrup. q. s. ut fiat massa in pilulas viij dividenda.

Dose.—A pill night and morning, in convulsions, dyspnœa, &c.

HOSPITAL OF LA PITIE'.¹

¹ Ryan's Formulary, 3d edit. p. 392. Lond. 1839.

POTASSII IODIDUM.

SYNONYMES.—Kalium Iodatum, Kali Hydroiodicum, K. Hydroiodicum, Hydroiodas Kalicus, Potassii Ioduretum, Iodide or Ioduret of Potassium. In solution—Potassæ Hydriodas, Potassii Proto-hydriodas, Potassii Protoxidi Hydriodas, Hydriodate of Potassa.

French.—Hydriodate de Potasse, Iodure de Potasse.

German.—Iodkalium, Iodwasserstoffsäures Kali.

METHOD OF PREPARING.

According to Tünnermann, the iodide of potassium is best prepared in the following manner :

One part of pure iron filings, with four parts of iodine, is put into a glass vessel—by many, into a glass retort—and six or eight parts of water are poured thereon ; gentle warmth is then applied, and the mixture is frequently shaken until the liquid appears clear and almost colourless. In this way, hydriodate of protoxide of iron is formed, which is dissolved in the water. It is now filtered ; the residuum washed several times on the filter with distilled water, and, under the application of a moderate heat, a concentrated solution of potassa is added, by small portions at a time, until a precipitate is no longer thrown down. In this process, the potassium separates the iodine from the hydriodic acid ; the oxygen of the former unites with the hydrogen of the latter ; protoxide of iron is precipitated, and carbonic acid given off,—heat being required for its entire disengagement, to prevent the formation of a carbonate of protoxide of iron with excess of acid, which would be soluble in the water. It is then filtered, the residue washed on the filter with distilled water, and the liquid evaporated so as to form crystals.

Those chemists or *pharmaciens*, who are not very accurate in their preparations, evaporate the mother waters to dryness, satisfying themselves, that although the saline residuum contains carbonated alkali, it may answer for external use ; which is decidedly objectionable. To prevent the loss of the iodide, owing to its admixture with the carbonate of potassa, in the mother waters, Tünnermann finds it most advantageous to neutralise it with the hydriodic acid, which may be prepared in the following manner : Dissolve about one dram of iodine in not very strong spirit of wine, and pass a stream of sulphuretted hydrogen into the solution, until it is wholly deprived of colour. The hydrogen unites with the

iodine,—the hydriodic acid, thus formed, remaining dissolved, whilst the sulphur is precipitated. The liquor is then filtered, the sulphur washed with a little water and the spirit and superfluous sulphuretted hydrogen gas are driven off by heating it in a glass vessel placed in a sand bath. The remaining fluid is diluted with water, filtered, and a warm alkaline ley added, until litmus paper is only feebly reddened. By evaporation, the iodide of potassium is obtained, which, by repeated solution in water, evaporation of the solution, and filtration, is obtained entirely pure.¹

The process of Turner is, to take any quantity of a solution of caustic potassa, and to add to it gradually, at a gentle heat, iodine sufficient to neutralise the alkali; then evaporating to dryness, calcining strongly, dissolving in water, and crystallising.

Dr. William Gregory² suggested an improvement on the process of Turner, which has been regarded one of the simplest.³ It consists in adding iodine to a hot solution of potassa until the fluid assumes a yellowish brown colour, then evaporating, and heating the residuum to low redness, in a platinum crucible. The mass which at first consists of iodide of potassium and iodate of potassa, thus loses all its oxygen, and becomes converted into iodide of potassium.

The formula of Caillot and Baup is—to take ten parts of iodine and fifty of distilled water; put them into a matrass, and add, in small successive portions, of pure iron filings, five parts, shaking the vessel each time. The liquor is then heated until it loses its colour, filtered, and the substance on the filter washed with boiling water, until the liquid is tasteless; the liquor, and the various liquids used in the washings, are united, and the whole is heated in a sand bath. When the temperature approaches that of ebullition, enough of a solution of subcarbonate of potassa is added, to precipitate all the oxide of iron; it is then filtered, and the substance on the filter washed until it is completely exhausted. All the liquors are then united, tested by reddened litmus paper, and if there be any excess of base, a little hydriodic acid is added. It is then evaporated in a sand bath, until a slight pellicle forms; the fire is now discontinued, and the salt is suffered to crystallise. Lastly, the crystals are washed with a little water, and then dried.⁴

¹ Riecke, *Die neuern Arzneimittel*, S. 305. Stuttgart, 1837.

² *Edinb. Med. and Surg. Journ.*, xxxvi. 369, for Oct. 1831.

³ Cogswell, on Iodine, p. 85.

⁴ Jourdan's *Pharmacopée Universelle*, i. 662. Paris, 1828; also the *Lond. Pharmacopœia*, and *Brande's Dictionary of Materia Medica*, p. 317. Lond. 1839.

The iodide of potassium crystallises in beautiful cubes. These are readily fused, and are volatilised at a red heat. They do not decompose, even when heated with access of air. They are readily soluble in water, and in alcohol, and the addition of the iodide facilitates greatly the solution of the iodine.

It would seem, that a slight contamination of iodide of potassium with carbonate of potassa is exceedingly common, as it can with difficulty be avoided in the manufacture of the salt; but Christison¹ affirms, that he has examined specimens, where the carbonate, with its accompanying water, amounted to 90 parts in the 100. "Can we wonder, then," he asks, "that practitioners should complain of the iodide of potassium, that they have given it for months, nay, even for years, without observing any effect either on the constitution, or on the disease for which it was administered?"

EFFECTS ON THE ECONOMY.

As respects the action of the iodide, and its administration in disease, it is scarcely necessary to do more than refer to what has been said under the head of iodine. On the whole, its effects appear to accord with those of iodine; at least, no difference is perceptible on the organism. It has been supposed, that it is to be preferred to pure iodine, where the object is to act especially on the urinary organs.² For external use, the iodide of potassium is usually preferred to pure iodine. It is constantly given internally, and often in combination with the latter; the solubility of which, as was before remarked, is aided by it. Many of the following formulæ contain both one and the other.

Dr. Buchanan asserts, that he has given the iodide of potassium in doses of $\mathfrak{zss}$, and the only precaution he observed was to make the patient drink freely of diluents. It was chiefly to determine some physiological questions that he gave it in such large doses. Two drams of it were taken by a young man affected with gonorrhœa, and as soon as the medicine made its appearance in the urine, blood was drawn from the arm. On examining the blood, both the serum and crassamentum were found deeply impregnated with iodine.³

¹ Edinb. Med. and Surg. Journal, April, 1838.

² Riecke, Die neuern Arzneimittel, u. s. w. S. 306. See, also, Cogswell on Iodine, p. 96.

³ Lond. Med. Gaz. July 2, 1836.

According to recent experiments of Magendie,¹ the iodide is one of the substances that promote the coagulation of the blood.

METHOD OF ADMINISTERING.

Liquor vel Solutio Potassii Iodidi.

Solution of Iodide of Potassium.

(SYNONYMES.—Potio resolvens ex Iodio, Solution de Coindet, Coindet's Solution.)

℞. Potassii iodidi, gr. xxxvj.
Aquæ destillat. ℥j. Solve.

Dose.—Same as that of the tincture of iodine.

COINDET AND MAGENDIE.

℞. Potassii iodidi, ℥j.
Aquæ destillat. ℥j. Solve.

Dose.—Fifteen drops three times a day, gradually increased to forty-five: in cases of ovarian dropsy,—frictions with iodine ointment being used at the same time.

ELLIOTSON.

Liquor vel Solutio Hydriodatis Potassæ Iodureta.

Solution of Ioduretted Hydriodate of Potassa.

℞. Iodin. ℥j.
Potassii iodid. ℥ij.
Aq. destillat. ℥vij. Solve.

Dose.—Six drops early in the morning, and in the middle of the day, in a glass of sugared water. In tetter, scirrhus, &c.

LUGOL.

Lugol has a solution of three strengths for internal use.

	I.	II.	III.
℞. Iodin.	gr. ʒ.	gr. i.	gr. 1ʒ.
Potass. iodid.	gr. iss.	gr. ii.	gr. iiss.
Aq. destillat.	℥vij.	℥vij.	℥vij.

Dose.—Two-thirds, daily, at first; afterwards, the whole.

Lugol recommends this threefold solution in the same cases as his threefold solution of iodine; the *first* being continued from fourteen days to three weeks; the *second*, from the fourth or fifth week of the treatment to its termination; the *third*, the strongest,

¹ Leçons sur le Sang; & translation in *Lancet*, for Jan. 26, 1839, p. 636.

he did not often use. As Riecke has observed, it would be better to have in the hospitals but one solution, which might be prescribed in varied doses.

Liquor Potassii Iodidi Compositus.—(Lond. Pharmacopœia.)

Compound Solution of Iodide of Potassium.

- ℞. Iodin. gr. v.
Potass. iodid. gr. x.
Aquæ destillat. ℥xx. M.

Dose.—f. ʒij to f. ʒvj.

Tinctura Iodinii Composita.—(Lond. Pharmacopœia.)

Compound Tincture of Iodine.

- ℞. Iodin. ʒj.
Potass. iodid. ʒij.
Sp. rectific. Oij. M.

Dose.—Ten minims.

Mistura Hydriodatis Potassæ Iodureta.

Mixture of Ioduretted Hydriodate of Potassa.

- ℞. Iodin. gr. ss.
Potass. iodid. ʒss.
Syrup. papav. ʒss.
Aq. destillat. ℥ss.

Dose.—Two table-spoonfuls three times a day; in cases of complication of syphilis with scrofula. TYRREL.

- ℞. Iodin. gr. iss.
Potassii iodid. gr. iij.

Solve in

Aquæ menth. pip. ʒiv.

Dose.—A spoonful two or three times a day. To children, a tea-spoonful. In cases of cancrum oris; also, in dropsy, gleet, and leucorrhœa. On renewing the prescription, the dose of the iodine may be increased one half, and of the iodide one grain, each time. COSTER AND FRIEDRICH.

Mistura Potassii Iodidi.

Mixture of Iodide of Potassium.

- ℞. Potass. iodid. ʒiv.
Aquæ lactucæ destill. ʒviij.
— menth. pip. ʒij.
Syrup. althææ, ʒj. M.

Dose.—A spoonful morning and evening, in a little water, in-

creasing the dose to two spoonfuls. In cases of hypertrophy of the ventricles of the heart.

MAGENDIE.

- ℞. Potass. iodid. ℥iv.
Aq. destill. lactuc. ℥viiij.
— flor. naphth. ℥ij.
Tinct. digit. ℥j. ad ℥ij.
Syr. althææ, ℥iss. M.

Dose.—Morning and evening, a spoonful, in a little water. In hypertrophy of the ventricles of the heart, with quickening of the heart's action.

MAGENDIE.

- ℞. Lign. quassæ.
Rad. gentian. aa. ℥j.
Aquæ fervent. ℥xvj.
Macera per horam et cola.
Liquor. colat. add.
Potass. iodid. gr. xxxvj.
Potassæ carbonat. ℥ij. M.

Dose.—A table-spoonful three times a day, in a glass of water.

CUMMING.

Pilulæ Potassii Iodidi.

Pills of Iodide of Potassium.

- ℞. Potass. iodid. gr. xv.
Aq. destillat. q. s.
Pulv. spong. ust.
Ext. dulcamar. aa. ℥ij
Pulv. rad. glycyrr. q. s

Fiant pilulæ clxxx.

Dose.—Six, two or three times a day, in scrofula, goître, &c.

VOGT.

Unguentum Iodinii Compositum.—(Pharm. Lond.)

Compound Ointment of Iodine.—Ioduretted Ointment.

- ℞. Iodin. ℥ss.
Potass. iodid. ℥j.
Spirit. rectific. f. ℥j.
Adipis. ℥ij.

Rub the iodine and iodide with the spirit; and mix with the lard.

Unguentum Potassii Iodidi.

Ointment of Iodide of Potassium.

- ℞. Potass. iodid. ℥ss.
Adipis, ℥iss. M.

Half a dram at first, and, subsequently, a whole dram to be rubbed in. In goître, scrofulous glandular affections, &c.

This ointment is generally too weak, unless combined with the internal use of iodine in some form. MAGENDIE.

℞. Potass. iodid. ℥j.
Adipis. ℥ss. M.

The wounded parts to be smeared with it two or three times a day: in moist tetter—serpigo. Between the applications, to be dressed with dry lint. TUENNERMANN.

In dry tetter, the ointment applied is formed of ℥j to ℥iss of the iodide to ℥j of lard.

Unguentum Kali Hydroiodici. (Pharmacop. Borussic.)

Ointment of Hydriodic Kali.

℞. Potass. iodid. ℥j.
Magnes. carb. gr. vj.
Aq. destillat. guttas nonnullas;

M. terendo cum,
Ung. rosat. ℥j. M.

Or,

℞. Potass. iodid.
Sodæ carbon. depur. sicc. aa. ℥ss.
Ung. rosat. ℥iv ad ℥vj. M.

A piece of the size of a small bean, to be rubbed in, morning and evening. In chronic enlargement of the testis. WALTHER.

℞. Potass. iodid. ℥ss.
Ext. opii. ℥ss.
Cerat. ℥j. M.

As a dressing to malignant cancerous ulcers.

Unguentum Potassii Iodidi Ioduretum.

Ointment of Ioduretted Iodide of Potassium.

℞. Iodin. gr. xij.
Potass. iodid. ℥iv.
Adipis, ℥ij. M.

In scrofulous ophthalmia, ulcers, &c.

LUGOL.

℞. Iodin. gr. xv.
Potass. iodid. ℥j.
Tinct. opii. ℥ij.
Adipis, ℥ij. M.

In painful scrofulous ulcers, white swellings, &c.

LUGOL.

Emplastrum Potassii Iodidi Ioduretum.

Plaster of Ioduretted Iodide of Potassium.

℞. Iodin.
Potass. iodid. aa. ℥ss. ad ℥j.
Emplastr. hydrarg.
Seu Saponis: ℥ij.

Applied in syphilitic and gouty swellings of the bones.

EBERS.

Lotio Potassæ Hydriodatis Iodureta.

Lotion of Ioduretted Hydriodate of Potassa.

℞. Iodin. gr. i. ad ij.
Potassii iodid. gr. ij. ad iv.

Solve in

Aquæ destillat. ℥viiij.

This solution was commonly used by Lugol externally, to be injected under the eyelids in strumous ophthalmia, fistulæ, &c.

LUGOL.

℞. Iodin. ℥ss.
Potassii iodidi. ℥j.

Solve in

Aq. destillat. ℥vj.

This "rubefacient solution of iodine," may be used two or three times a week, when the last prescription loses its effect, or when it is desirable to stimulate more actively. It is also added to baths—three or four ounces to an ordinary bath—as well as to poultices, being mixed with an ordinary cataplasma.

LUGOL.

℞. Iodin. ℥j.
Potass. iodid. ℥ij.

Solve in

Aquæ destillat. ℥ij.

This "caustic iodine solution" has to be used when the last loses its efficacy. It occasions a crust on the parts. Lugol employs it chiefly, when the skin on the edges of the ulcers is greatly hypertrophied, red, and fungous, as well as in phagedenic or spreading tetters. It may be applied two or three times a week, or daily, should the case require it.

LUGOL.

Collyrium Potassæ Hydriodatis Ioduretum.

Collyrium of Ioduretted Hydriodate of Potassa.

℞. Iodin. gr. ss. ad i.
Potassii iodid. ℥ss.

Solve in

Aq. rosar. ℥iij. M.

To be applied four times a day, in cases of scrofulous ophthalmia, with ulceration of the conjunctiva and cornea.

MAGENDIE.

POTASSII IODO-HYDRARGYRAS.

SYNONYMES.—Iodo-Hydrargyrate of Potassium. Iodhydrargyrate of Ioduret of Potassium.

Dr. A. Channing,¹ who has highly extolled this preparation in various diseases, affirms, that this, with other new salts, was discovered by Bonsdorf, of the University of Finland, in 1826; and it is a fact well known to the chemist, that iodine, chlorine, &c. enter into combinations so as to form both acids and bases.

By experiment, Dr. Channing ascertained, that a solution of eight grains of the pure iodide of potassium in ten or fifteen minims of water, would combine with a fraction less than eleven grains of the deuto-iodide of mercury, maintaining the combination in solution, when diluted with water or alcohol to any extent. If more than eleven grains of the deuto-iodide be added, although a small excess is dissolved in the concentrated solution, on diluting with water, it is promptly precipitated. It would appear, therefore, as Dr. Channing has remarked, that in preparing this salt for administration, the labour of crystallising it, in order to obtain a solution of a definite strength, is wholly unnecessary; inasmuch as a solution, combining a fraction more than eight grains of the iodide of potassium with eleven grains of the iodide of mercury, may be used as containing twenty grains of the iodo-hydrargyrate of potassium.

If it be desirable to obtain the preparation in a crystallised form, it is important, that the definite proportions of the two iodides be observed, and particularly that there be no excess of the iodide of mercury; for the saturated solution of eight grains of the iodide of potassium will dissolve, and enter into combination with more than thirteen grains of the iodide of mercury, forming similar crystals soluble in alcohol, but in water precipitating more than two grains of the iodide of mercury.

EFFECTS ON THE ECONOMY.

These are similar to those of the iodides of mercury, but, according to Dr. Channing, in a less degree. The iodo-hydrargyrate is not, however, much employed, experience seeming to have shown, that it possesses no essential, if, indeed, any advantages

¹ American Journal of the Medical Sciences, Feb. 1834, p. 388.

over those preparations. Puche¹ has recently recommended it as not being so subject to produce salivation, or pains in the bones, as the other combinations of mercury and iodine.

METHOD OF ADMINISTERING.

Mistura Potassii Iodo-Hydrargyratis.

Mixture of Iodo-Hydrargyrate of Potassium.

℞. Hydrarg. deuto-iodid. gr. iv.
Potassii iodid. ℥j.
Aquæ destillat. ℥j. M.

Dose.—Five drops three times a day.

CHANNING.

Tinctura Potassii Iodo-Hydrargyratis.

Tincture of Iodo-Hydrargyrate of Potassium.

℞. Potass. iodo-hydrarg. gr. j.
Spiritus vini tenuioris ℥j. M.

Dose.—Ten drops three times a day.

CHANNING.

Solutio Iod-Hydrargyratis Iodureti Potassii.

Solution of Iod-Hydrargyrate of Ioduret of Potassium.

℞. Hydrarg. biniodid. gr. viij.
Potassii ioduret. gr. viij.
Aquæ destillat. ℥viij.

Dose.—f. ℥ij to f. ℥ij in twenty-four hours.

PUCHE.

Pilulæ Iod-Hydrargyratis Iodureti Potassii.

Pills of Iod-Hydrargyrate of Ioduret of Potassium.

℞. Hydrarg. biniodid. gr. viij
Potassii ioduret. gr. viij.
Sacchar. lact. gr. lxiv.
Aquæ gum. q. s. ut fiant pilulæ xxxij

Dose.—One to eight, daily.

PUCHE.

¹ Journal des Connaissances des Médicales, Oct. et Nov. 1838, and Janvier, 1839, and Annales de Chimie, Oct. 1838.

QUININA.

SYNONYMES.—Chininum, Chinium, Quininum, Quinium, Quinia, Kininum, Quina, Sal Essentiale Corticis Peruviani.

French.—Quinine, Kinine.

German.—Chinin.

Quinine is, doubtless, a most important gift from modern analytical chemistry to medicine. Not many years have elapsed since the discovery of this substance, and yet, by general consent, it is now regarded as one of the most valuable remedies in the catalogues of the *materia medica*. The honour of the discovery—which had been facilitated by the investigations of other chemists, as to the composition of the cinchona barks—belongs to Pelletier and Caventou, (1820 ;¹) and so rapidly and extensively was its efficacy promulgated, that in the year 1826, in two laboratories in Paris for the preparation of quinine, fifty-nine thousand ounces of the sulphate—the form best known, and most frequently prescribed—were prepared. For this discovery, the Royal Academy of Sciences of Paris awarded MM. Pelletier and Caventou the Monthyon prize of ten thousand francs.

Quinine is obtained from the yellow bark by a similar process to the one described for the separation of the cinchonine.² In the pure state, it is of a white colour, and appears commonly in the form of powder ; it crystallises, however, in silky, shining, tufted needles. In both cases, it contains from three to four per cent. of water. By a gentle heat, this escapes, and the quinine melts into a transparent fluid, which, on cooling, is translucent, and similar to a resin. When melted *in vacuo*, it has a crystalline appearance. In a strong heat, it is decomposed. It has a very bitter taste ; and is soluble in two hundred parts of boiling water ; a portion being precipitated on cooling. It requires a much larger proportion of cold water to dissolve it. In alcohol, it is far more soluble than in water. It is, likewise, soluble in ether, and somewhat so in oils. It exhibits an alkaline reaction,—restoring the colour of reddened litmus paper, and neutralising the acids.

¹ *Annales de Chimie et de Physique*, xv. 289 & 337.

² See page 137.

The observations of Piorry and Lavollée¹ and of Quévenne² show, that the quinine, as well as its sulphate, passes into the urine of patients who use it in any considerable quantity.

EFFECTS ON THE ECONOMY.

Of the effects of quinine we shall speak at some length, under the head of SULPHATE OF QUININE, with which it seems to accord entirely in medicinal agency. Several physicians, who have experimented in regard to the efficacy of pure quinine and its salts, have found the first in no respect inferior to the last. Such was the experience of Niewenhuis and Elliotson, the latter of whom exhibited the quinine in large doses—as much as five grains every four hours. A French physician, Blegnie,³ even gives the preference to the pure quinine—because it possesses, he thinks, equal efficacy, is cheaper, easier taken, and better borne than the sulphate. He advises, that after each dose an acidulous drink should be taken, to render its solution in the stomach more rapid. Wutzer⁴ and Harles⁵ have also recommended the more frequent use of pure quinine.

It may be given either in the form of powder or pill, or in alcoholic solution.

Tinctura Quininæ.

Tincture of Quinine.

℞. Quinin. ℥j.

Solve in alcohol. ℥ss.

Dose.—Twenty to forty drops every two hours. WUTZER.

¹ Gazette Médicale, 1836, p. 73.

² L'Expérience, Juillet, 1838.

³ Riecke, Die neuern Arzneimittel, S. 118. See, also, Bally, in Magendie's Journal de Physiologie, ii. 236.

⁴ Isis, p. 441, 1829.

⁵ Heidelberg klinisch. Annalen, B. v. H. 4, S. 573.

QUININÆ ACETAS.

SYNONYMES.—Chinium Aceticum, Acetas Chinii, Acetas Chinini, Acetas Chinicus, A. Quiniæ, A. Quinæ, A. Quinini, A. Quinii, A. Kinini, Acetate of Quinine.

French.—Acétate de Quinine.

German.—Essigsäures Chinin.

This preparation has only recently been introduced into practice, but it is not much employed.

It is prepared by saturating quinine with concentrated acetic acid diluted with water, and evaporating the neutral solution, by gentle heat, to crystallisation.

It appears in the form of very delicate, needle-shaped, snow-white, satiny, and shining crystals; tastes very bitter; and is with difficulty soluble in cold water, but readily so in hot.

Wutzer and Sundelin¹ assert, that it acts like the other salts of quinine, but merits no preference.

QUININÆ CITRAS.

SYNONYMES.—Quinini Citras, Quiniæ vel Quinæ vel Quinii vel Chinini vel Kinini Citras, Citras Chinicus, Citrate of Quinine.

French.—Citrates de Quinine.

German.—Zitronensäures Chinin.

MODE OF PREPARING.

This preparation is formed, like the acetate of quinine, from an aqueous solution of citric acid and pure quinine, or by the decomposition of a hot solution of sulphate of quinine, by means of an acid citrate of soda.²

It forms needle-shaped prisms, of a white colour, which are by no means readily soluble in water.

¹ Isis, p. 441, 1829: also, Heidelb. klinisch. Annal. B. v. H. 4. 575.

² Guleani, in Annali Universali di Medicina, Luglio, 1832, and Heidelb. Klinisch. Annal. B. x. H. i. S. 34. Heidelb. 1834.

EFFECTS ON THE ECONOMY.

The acetate and the citrate of quinine have been esteemed and are adapted for those excitable persons with whom the sulphate does not seem to agree. The citrate has been prescribed by many Italian physicians, and found to be very efficacious.¹ Magendie considers it, when it contains an excess of acid, advisable for those cases, where the union of a tonic with an antiseptic property is indicated. He considers, that the following syrup may be substituted, in certain cases, for the *syrupus antiscorbuticus*.²

Syrupus Quininæ Citratis.

Syrup of Citrate of Quinine.

℞. Syrup. sacchar. clarif. ℥j.

Quinin. acetat. acid. gr. xxxvj. M.

Dose.—Two spoonfuls in the twenty-four hours.

QUININÆ FERROCYANAS.

SYNONYMES.—Chinium Ferrocyanogenatum, Ferrocyanas Chinii, &c.

French.—Ferrocyanure de Quinine.

German.—Eisenblausaures Chinin.

METHOD OF PREPARING.

This is obtained by the decomposition of sulphate of quinine by means of a solution of the ferrocyanate of potassa; after which the impure salt is treated with warm spirit of wine, and the clear solution is evaporated.³

¹ Beraudi, in Bulletin Général de Thérapeutique, Nov. 1838.

² This syrup is directed by the Codex Medicamentarius of Paris to be prepared in the following manner. Take of the fresh leaves of the cochlearia, water trefoil, cress, horseradish, and bitter oranges cut, of each one pound; cinnamon, an ounce and a half, white wine, four pints. Macerate for two days in a tin cucurbit, covered with a well luted capital. Distil, in a sandbath, a pint of fluid; to which add two pounds of white sugar, and make into a syrup. Pass through a cloth, without straining, what remains in the cucurbit; let the liquor rest, decant and boil to the consistence of syrup, with two pounds of white sugar. When cold, clarify and mix with the other.

³ See Bertozzi's Method, in Philad. Journ. of Pharmacy, vol. 2, new series, p. 82. Philad. 1837.

It forms needle-shaped, confused crystals, of a greenish yellow colour, and very bitter taste, recalling that of the hydrocyanic acid. It dissolves readily in spirit of wine, not so in water; and is decomposed by hot water.

EFFECTS ON THE ECONOMY.

In this combination, the antifebrile properties of the quinine are said to be even superior to those of the other preparations; yet the remedy has not got into much use. It has been employed mainly by a few of the French practitioners. Cerioli,¹ an Italian physician speaks in high terms of its efficacy in periodical diseases, even where the sulphate has failed. He gave it in the dose of from two to eight grains, in the day; and Gouzee² gives the history of three cases completely cured by the administration of a single grain, half an hour before the paroxysm.

QUININÆ MURIAS.

SYNONYMES.—Chinium Muriaticum, Ch. Salitum seu Hydrochloricum, Hydrochloras Chinii, H. Chinicus.

French.—Muriate de Quinine.

German.—Salzsaures Chinin.

Perhaps, next to the sulphate of quinine, this salt has most frequently been employed in practice.

METHOD OF PREPARING.

It is obtained by dissolving pure quinine in dilute muriatic acid, or by the decomposition of the sulphate of quinine dissolved in warm water by means of a solution of muriate of baryta, which is added so long as a white precipitate is thrown down; the hot mixture is then filtered; the precipitate washed, and the clear fluid evaporated, by a gentle heat, to crystallisation, so long as crystals shoot on cooling; these are collected, washed in cold water, and purified by repeated crystallisation.

¹ *Annali Universali di Medicina*, Luglio, 1832, and *Archives Générales de Médecine*, Dec. 1832.

² *Observateur Médicale Belge*, Jan. 1834.

It forms fine, needle-shaped, white, silky crystals, of a mother of pearl lustre; does not dissolve readily in water, but more so than the sulphate.

EFFECTS ON THE ECONOMY.

In this respect, the muriate agrees with the sulphate of quinine, and by those of weak digestive powers is better borne. Spielman¹ asserts, that it is a more speedy and effectual remedy for intermittent fever than the sulphate, and it is more soluble. It is, however, more expensive. The dose is generally considered to be the same as that of the sulphate. It is better given in solution than in powder. Spielman rates the dose at from half a grain to a grain.

QUININÆ NITRAS.

SYNONYMES.—Chinium Nitricum, Nitras Chinii, &c. Nitrate of Quinine.

French.—Nitrate de Quinine.

German.—Salpetersaures Chinin.

METHOD OF PREPARING.

This salt is obtained, like the muriate, by the addition of nitric acid to quinine; or by the decomposition of nitrate of baryta by sulphate of quinine.

It is, at first, a fluid oil-like mass, which gradually becomes solid. In union with water, it forms crystals. It dissolves with difficulty in water, but readily in alcohol.

¹ Allgemein. medicinisch. Zeitung, and Journal des Connais. Médic. Février, 1836; see, also, Prof. Dierbach, in Heidelb. klinisch. Annal. B. x. H. i. S. 33. Heidelb. 1834.

QUININÆ PHOSPHAS.

SYNONYMES.—Chinium Phosphoricum, Phosphas Chinii, Ph. Chinini, Phosphate of Quinine.

French.—Phosphate de Quinine.

German.—Phosphorsaures Chinin.

METHOD OF PREPARING.

In the mode of preparation it accords with the preceding forms ; dilute phosphoric acid being added to quinine, or phosphate of baryta, to the sulphate of quinine.¹

It appears in the form of needle-shaped prisms, of a mother of pearl lustre, which are, like the muriate of quinine, readily soluble in water, and spirit of wine. Harles,² however, affirms, that in the neutral condition it is soluble, with difficulty, in water.

The phosphate is regarded by some to stand next to the sulphate in medicinal efficacy.

QUININÆ SULPHAS.

SYNONYMES.—Chinium Sulphuricum, Disulphas Quinæ, Sulphas Chinii, Sulphas Quinicus, Sulphate of Quinine.

French.—Sulfate de Quinine.

German.—Schwefelsaures Chinin, Chininsulphat.

This preparation of quinine is by far the most frequently administered. It is in fine, silky, flexible needles, and at times, in rectangular columns. Its taste is extremely bitter and resembles that of yellow bark. Exposed to a moderate heat, it loses its crystalline form, in consequence of the escape of its water of crystallisation. It is only slightly soluble in cold water, requiring 470 parts of water at the ordinary temperature, and 30 parts of boiling water for its solution. In alcohol, it is very soluble, but only slightly so in ether. With sulphuric acid, it forms a supersulphate, which is

¹ Winkler, in Büchner's Repert. and Philad. Journ. of Pharmacy, new series, vol. 2. p. 12. Philad. 1837.

² Heidelb. klinisch. Annal. B. x. H. i. S. 36. Heidelb. 1834 ; and Journal de Chimie Médicale, 1837.

much more soluble in water than the neutral salt, and hence we usually add a few drops of dilute sulphuric acid to our mixtures of the sulphate of quinine.

METHOD OF PREPARING.

This salt is generally prepared on a large scale in the chemical laboratories of France; whence we obtain it. A formula has been admitted, however, into the Pharmacopœia of the United States, which is taken from the process of M. Henry, junr.,¹ for which he received a prize from the *Académie Royale des Sciences*, of Paris. It is as follows—Take of yellow bark, in powder, a pound; lime, in powder, four ounces; sulphuric acid, alcohol, animal charcoal, distilled water, each a sufficient quantity. Boil the bark for half an hour with eight pints of the distilled water, acidulated with a fluid ounce of the sulphuric acid. Strain the decoction through linen; then boil the residue with the same quantity of acidulated water, and filter as before. Mix the filtered liquors, and gradually add the lime, stirring constantly. Wash the precipitate with distilled water, and having dried it, digest in alcohol with a moderate heat. Pour off the tincture, and repeat the digestion several times, till the alcohol is no longer rendered bitter. Mix the tinctures, and distil over the alcohol, till a brown viscid liquid remains in the retort. Upon this substance, removed from the retort, pour as much sulphuric acid, largely diluted with water, as may be sufficient for its perfect saturation. Then add the animal charcoal, and having evaporated the liquor sufficiently, filter it while hot, and set it aside to crystallise.²

It results from the calculations of Pelletier and Caventou, that from a quintal of cinchona, two pounds, one dram and thirty grains of sulphate of quinine may be obtained, which makes two drams, sixty-six grains and a sixth per pound, or thirteen grains and two sixths per ounce; and as the sulphate of quinine is composed of nine parts and nine tenths of sulphuric acid, to ninety and a tenth of quinine, it follows, that if the dose of cinchona in substance be two drams, we should administer to the patient three grains and nine thirty secondths of a grain of the sulphate of quinine; not taking into account a small quantity of sulphate of cinchonine, which may be mixed with it. Four grains of the salt are, consequently, more than an equivalent for the dose of the cinchona

¹ Journal de Pharmacie, vii. 296. Juillet, 1821.

² Wood & Bache's Dispensatory, Art. Quiniæ Sulphas.

often prescribed in substance. Those practitioners, therefore, who prescribe thirty-six or seventy-two grains of the sulphate, give the representative of about twenty-seven drams of cinchona in the former case, and of fifty-four in the latter.¹

EFFECTS ON THE ECONOMY.

The effects of the preparations of quinine on the healthy organism, have not been much investigated. According to Caventou, they produce a general excitement, similar to that caused by coffee, and Wittmann affirms, that the sulphate induces an excitement similar to that of a paroxysm of fever. Hirschel,² too, asserts, that in a child, four years of age, to whom the sulphate was given in a case of intermittent, a general chilliness of some minutes' duration supervened immediately on the taking of the remedy, succeeded, in the course of half an hour, by general heat, and this again by a gentle perspiration, in all respects resembling a mild attack of fever.

The excitant action of the salts of quinine formed by the vegetable acids is said to be less striking.

The sulphate of quinine, in large doses, appears, in some cases, to possess narcotic properties, yet it cannot be classed amongst poisons, as it has been given to healthy individuals in very large doses, without any unpleasant effects. Bally,³ for instance, gave it to the extent of 110 grains in the day without any inconvenience.

Dr. Thomas Fearn,⁴ who administered it largely, regards it to be more narcotic than sedative,—usually, he thinks, stimulating in small doses, but in large doses the stimulant effects not being obvious, but rather the reverse.

When Mr. Scott,⁵ a medical gentleman and a martyr to dyspepsia, took the quinine in very large doses, under the idea that his malady was intermittent neuralgia, he found several singular phenomena induced thereby. He was directed to commence with two grains three times a day, until he arrived at twenty grains for a dose, that is, a dram a day. Until the doses were increased to fourteen or sixteen grains, he did not experience any peculiar effects, but he now began to feel heat of skin, dryness of mouth and

¹ Jourdan's *Pharmacopée Universelle*, ii. 375. Paris, 1828.

² Hufeland's *Journal*, B. lxi. St. 6. S. 140.

³ *Revue Médicale*, v. 244. Juillet, 1821.

⁴ *Transylvania Journal of Medicine*, Oct., Nov., and Dec. 1836, p. 708, and *Amer. Med. Intell.*, June 15, 1837, p. 109.

⁵ *Lond. Med. and Physical Journal*, March, 1833.

fauces, and obstinate constipation. He likewise lost the power of naming substantives; was obliged for a long while to consider what familiar things were called, and was unable to cast up a line of six or eight figures correctly. His perceptions of quantity were likewise impaired, so that in prescriptions he wrote ounces for drams, drams for grains, &c. &c. He still, however, persevered, with the quinine until he took $\mathfrak{Dj}$ four times a day, but he was unable to continue these excessive doses long, the untoward symptoms augmenting, so that he was often unable to stand, and fell several times in the street.

In impressible individuals, the sulphate and the muriate not unfrequently induce a sense of anxiety, restlessness, vertigo, confusion, depravation of vision, tinnitus aurium, and, in many cases, transient deafness, all which symptoms appear to be of a neuropathic character, and, it has been affirmed, occur more frequently in females, especially in those who are pregnant or suckling—and in persons of slender and delicate conformation.¹ In certain cases, the quinine and its salts seem to have caused ptyalism—the saliva being inodorous, and the teeth firm; and when calomel has been given along with it, it has been conceived, that ptyalism has ensued sooner than it otherwise might have done.

The most striking agency of quinine and its salts, is in cases of periodical diseases of all kinds; and especially in intermittent fever: they have now, indeed, almost wholly taken the place of the cinchona, over which they possess many points of preference. In the first place, their bulk is much less; they therefore do not oppress the stomach so much, whilst the impression of the cinchona on that organ not unfrequently interferes with its antipyretic properties. In malignant fevers, too, it is often impossible to introduce the requisite quantity of cinchona into the organism, to prevent the succeeding paroxysm, and the life of the patient is consequently placed in the greatest danger. In this case, the sulphate of quinine is invaluable; possessing, as it does, the febrifuge virtues of the cinchona in such a concentrated state, that but a small quantity is required to produce equal efficacy with a large quantity of the powdered cinchona. In such cases, indeed, the latter is apt to disagree with, or be rejected by the stomach, before its full influence can be exerted. In these pernicious fevers, that occur especially in Italy and Holland, the sulphate of quinine has supported life in innumerable cases where the cinchona, in substance, might have

¹ Riecke, Die neuern Arzneimittel, S. 120.

failed, and has thereby best exhibited its sanative agency.¹ In these cases, the quinine is administered without regard to complications, which, in less urgent cases, might be allowed to interfere with its administration. Another advantage, ascribed to the quinine, is, that in cases of paroxysmal fevers, in which the attacks follow each other so closely, that the second commences before the first has terminated, it may be given during the paroxysm, a time at which the cinchona would be apt to occasion oppression of the stomach and vomiting. It has likewise been found advantageous in large doses—twelve to thirty grains daily—in engorgement of the spleen, consequent on intermittent fever.²

Besides their febrifuge property, the salts of quinine possess a tonic virtue, which adapts them for numerous cases in which that class of remedies is indicated. Yet there are many who think that the cinchona is better calculated for such cases than the quinine, and who administer the latter to prevent the paroxysms of an intermittent, but have recourse to the cinchona, when they are desirous of fortifying the system to prevent a relapse. There are cases, too, which resist the quinine and its preparations, and which subsequently yield to the cinchona in substance, but this may be owing to the quantity of lignin, or woody matter in the bark in substance, aiding the quinine of the cinchona in producing that new impression on the nerves of the stomach, which is necessary to break in upon the paroxysmal catenation.

In its antiseptic virtues, also, the sulphate of quinine is inferior to the cinchona. It has been doubted, indeed, whether it possess any such virtues at all.

Lastly: there is an advantage possessed by the sulphate of quinine,—that in irritable or impressible persons, it may be exhibited endermically, and thus no disorder be induced in the digestive powers. It need scarcely be said, that the cinchona is not adapted for this mode of administration.

MODE OF ADMINISTERING.

The sulphate of quinine may be administered internally in the form of powder or pill, and in solution in water, alcohol, or syrup.

¹ Repertorio Medico-Chirurgica per l'anno 1822, Torino. No. 22. Med. Chirurg. Zeitung, B. ii. S. 137, 1823; & Richter's Specielle Therapie, B. x. S. 326, Berlin, 1828.

² Bulletin Général de Thérapeutique, Nov. 30, 1837.

The average dose, in the twenty-four hours of apyrexia, is from four to ten grains; yet it has been given frequently to a much greater extent. As in the case of the cinchona, it has also been advised that a large dose should be given immediately before the expected paroxysm, so as to render the frequent administration during the apyrexia unnecessary; this dose need not be so great as the combined doses would amount to, so that there may be economy in the plan. Dupasquier, Elliotson,¹ ourselves, and many others, have found this course eminently successful; but some object to it.

A case of severe remittent has been detailed by Dr. Thomas Fearn,² in which he gave, at one dose, three tea-spoonfuls—weighing thirty-two grains. At the end of an hour, there was a diminution in the frequency of the pulse—"the invariable effect of large doses of quinine, when its operation is favourable." The dose was repeated, and at the end of another hour, it was again given, making ninety-six grains in two hours. Dr. Fearn remarks, that his usual practice in remittent fever had been to give three doses of twenty grains each, with an interval of an hour between.

Generally, between the paroxysms, several doses are administered; and, according to the particular case, the efficacy of the salt of quinine is attempted to be increased by the addition of antimonials, laxatives, carminatives, &c., and in pernicious or malignant intermittents especially, of opium or morphine.

By many, a combination of the quinine with moderate doses of the cinchona is highly recommended. Chapman advises its union with piperine: a combination with the alcoholic extract of cinchona has also been prescribed.

Mr. Sherwin,³ of Hull, affirms, that a piece of apple, chewed for a moment, immediately annihilates the bitter taste left by the sulphate of quinine.

The sulphate of quinine may be used in the way of enema, and endermically, when the condition of the stomach forbids its internal employment. As an enema, four grains or more may be mixed with starch, and be thrown up a short time before the paroxysm, or at the inception of the same. In this way it has been found efficacious.⁴

In administering the sulphate, or muriate of quinine endermically, a space on the surface of the body is deprived of its cuticle by means of a blister, and on this denuded portion the agent is

¹ Medico-Chirurgical Transactions, xii. 543, Lond. 1824.

² Op. cit.

³ Lond. Med. Gazette, April 1, 1837.

⁴ Richter, Op. cit. S. 331. Berlin. Medicin. Zeitung, Jan. 4, 1837.

applied either in the form of powder or of ointment. In testimony of the efficacy of this mode of administering the salts of quinine, many observers have come forward,—Lesieur, Lember, Martin, Wesche, Lehmann, Reilingh, Stratingh, Lieber, and others. From four to eight grains may be placed on the denuded part once or oftener in the day. Dr. Lieber, of Berlin, seems to have prescribed the salt most frequently in this way: he mentions, that of sixty cases, in which he employed it, only eight or ten were unsuccessful; and there was reason to believe, that in these cases the internal administration of the sulphate of quinine would have failed also. In the case of adults, he applies a blister in the evening—of the size of a dollar—over the epigastric region: in the morning, during the apyrexia, the blister is cut; the cuticle removed, and five or six grains—in children two grains—of the sulphate are sprinkled over the denuded surface. The whole is then covered with adhesive plaster, which must extend to the breadth of a finger, over the edges of the blistered part.

The sprinkling of the sulphate always occasions a violent burning sensation, but if it be applied in the form of ointment this evil is avoided, or at least diminished. The pain, however, speedily disappears. Some hours after the application of the remedy, oppression is felt in the stomach, with a desire to vomit, without, however, vomiting supervening; borborygmi, or uneasiness in the bowels, and frequently fluid dejections, with augmented secretion of saliva, which, in some cases, continues for several days.

In the course of from twelve to twenty-four hours after the application, a very bitter taste is generally perceived over the whole tongue, similar to that of the quinine; and if the application has been made sufficiently long before the anticipated paroxysm, it may be entirely prevented, or be rendered much milder. After the effect has been produced, the adhesive plaster may be kept applied for some days, and, if the sore is not healed, it may be dressed with simple applications. In only two cases did Dr. Lieber observe any extensive or offensive suppuration; and both healed under simple dressings with dry lint.

Rubbing the quinine on the gums has, likewise, been occasionally recommended, as well as frictions with the alcoholic solution on these as well as other portions of the surface of the body—the thighs, groins, and pit of the stomach;¹ and it has been advised in

¹ Dr. Schuster, cited in *Amer. Journ.* May, 1832, p. 242; and Antonini, *Journal des Connoissances*, Oct. 1838.

cases of intermittent cephalalgia, and in iralgia, to be snuffed up the nostrils.¹

Syrupus Quininæ Sulphatis.

Syrup of Sulphate of Quinine.

- ℞. Quinin. sulphat. gr. xvj.
Syrup. simplic. ℥viiij. M.

Dose.—A spoonful.

MAGENDIE.

Syrupus Quininæ Sulphatis Compositus.

Compound Syrup of Sulphate of Quinine.

- ℞. Quinin. sulphat. gr. xvj.
Acid. sulphur. dilut. gtt. v.
Syrup. limonis, ℥viiij. M.

Dose.—Same as the last.

Tinctura Quininæ Sulphatis.

Tincture of Sulphate of Quinine.

- ℞. Quinin. sulph. gr. vj.
Solve in
Alcohol. 34° (.847) ℥j.

Dose.—℥j or ℥ij, immediately before an attack of fever.

MAGENDIE.

Guttæ Quininæ Sulphatis et Opii.

Drops of Sulphate of Quinine and Opium.

- ℞. Quinin. sulphat. (seu acetat.) gr. xij.
Solve in
Spirit. vini rectific. (seu liq. anodyn. Hoffman.) ℥ss.
Adde
Tinct. opii simpl. gtt. xij.

Dose.—Morning and evening, twenty drops, in the summer fevers of Europe.

SCHMIDT.

Pulveres Quininæ Sulphatis.

Powders of Sulphate of Quinine.

- ℞. Quinin. sulphat. gr. iij. ad. xij.
Sacchar. alb. ℥ij.

Misce et fiat pulvis in partes vj æquales dividendus.

Dose.—A powder morning and evening, in nervous debility and in intermittents.

¹ B. St. Hilaire, in Gazette Médicale de Paris, Mars 26, 1836.

Radius¹ advises, that the powders should be taken in coffee, by which means the bitter taste is almost wholly counteracted.

RADIUS.

Pulveres Quininæ Sulphatis et Sodæ Carbonatis.

Powders of Sulphate of Quinine and Carbonate of Soda.

- ℞. Quinin. sulphat. gr. j.—ij.
Sodæ carbonat. gr. iv.—v.
Sacch. alb. ℥j.

Misce et fiat pulvis.

Dose.—A powder, morning and evening, in scrofulous ophthalmia.

VON AMMON.

Pulveres Quininæ Sulphatis et Antimonii Tartratis.

Powders of Sulphate of Quinine and Tartarised Antimony.

- ℞. Quinin. sulphat. gr. x.
Potass. et antim. tartrat. gr. iiij.
Sacchar. alb. gr. xxij.

Misce exactè, et divide in partes sex æquales.

Dose.—One, every two hours, during the apyrexia, in cases of obstinate intermittents.

GOLA.²

Pulveres Quininæ Sulphatis et Opii.

Powders of Sulphate of Quinine and Opium.

- ℞. Opii puri, gr. j.
Quinin. sulph. gr. iiij.
Sacchar. alb.
Gum acac. aa. gr. vj. M. fiat pulvis.

To be taken a short time before the paroxysm in malignant intermittents.

NEUMANN.

Pulveres Quininæ Sulphatis et Morphinæ Sulphatis.

Powders of Sulphate of Quinine and Sulphate of Morphine.

- ℞. Quinin. sulph. gr. ij. ad vj.
Morphinæ sulph. gr. ½ ad j.

Divide in dos. iv.

MAGENDIE.

¹ Auserlesene Heilformeln, u. s. w. Leipz. 1836.

² Annali Univers. di Medicina, tom. 35.

Pulveres Quininæ Sulphatis Compositi.

Compound Powders of Sulphate of Quinine.

- ℞. Quinin. sulph. gr. j.
 Pulv. cinchon. optim. gr. xv.
 Pulv. rhei,
 Oleosacchar. menth. aa. gr. v.

Misce et fiat pulvis.

Eight of these to be given in cases of intermittent fever.

NAUMANN.

- ℞. Quinin. sulph. gr. ʒ.
 Chocolat. gr. viij.
 Sacchar. lact. gr. ij.

Misce. Fiat pulvis tertiis omnibus horis sumendus.

In debility of the stomach.

KOPP.

Pilulæ Quininæ Sulphatis.

Pills of Sulphate of Quinine.

- ℞. Quinin. sulphat. gr. v.—xij.
 Succ. glycyrrhiz. ʒj.

Misce et fiant pilulæ xij.

To be given, according to prescription, in nervous diseases.

RADIUS.

Pilulæ Quininæ Sulphatis Compositæ.

Compound Pills of Sulphate of Quinine.

- ℞. Quinin. sulphat. gr. x.—xv.
 Acid. phosphoric. sicc. ʒij.
 Pulv. rad. althææ, (vel rhei,) ʒiv.
 Ext. centaur. minor. (vel gentian.) ʒij.

Misce et fiant pilulæ lx.

Dose.—Three to six pills, two or three times a day, in cases of nervous debility, with disposition to hemorrhage, as after abortion.

RADIUS.

- ℞. Quinin. sulphat. gr. xv.
 Pulv. cinnam. ʒss.
 Extract. cinchonæ q. s. ut fiant pilulæ xxx.

Dose.—Four pills every two to four hours.

HENSCHEL.

- ℞. Quinin. sulphat. gr. xij.
 Extract. trifol. ʒj.
 Pulv. rad. calam. aromat. q. s.

Fiant pilulæ xij.

Dose.—One or two, every two hours.

HILDENBRAND.

Mistura Quininæ Sulphatis.

Mixture of Sulphate of Quinine.

- ℞. Quinin. sulphat. gr. xij.
 Acid. sulph. dil. gtt. v.
 Aquæ cinnam. simpl. ℥vj.
 Syrup. cinnam. ℥j. M.

Dose.—A table-spoonful.

Pulvis Sternutatorius ex Quininæ Sulphate.

Sternutatory Powder of Sulphate of Quinine.

- ℞. Quinin. sulphat. gr. xv.
 Tabaci sternutator. com. ℥j. M.

To be snuffed up the nostrils in the course of five or six days,
 in cases of intermittent headach.

- ℞. Quinin. sulphat. gr. vj.
 Pulv. sacchar. pur. ℥j.
 Pulv. rad. iridis, ℥iss. M.

Small pinches of this to be snuffed up the nose at night.

B. ST. HILAIRE.

Unguentum Quininæ Sulphatis.

Ointment of Sulphate of Quinine.

- ℞. Quinin. sulphat. ℥j.
 Alcohol (38° ad 40°) q. s. (℥ij.)
 Acid. sulphuric. q. s. (gtt. lxxx.)
 Adipis suill. ℥iv. M.

Half an ounce at a time to be rubbed on the groins in malignant
 intermittents. It is likewise placed in the axilla.

ANTONINI.

Vinum Quininæ.

Wine of Quinine.

- ℞. Quinin. sulphat. gr. xij.
 Vin. Mader. ℥ij. M.

The wine of quinine may also be made extemporaneously, by
 adding two ounces of the tincture to each pint bottle of wine.

QUININÆ, ET CINCHONINÆ, TANNAS.

SYNONYME.—Tannate of Quinine, and Cinchonine.

Dr. Otto¹ has recently drawn the attention of physicians to the efficacy of the *Tannates of Quinine and Cinchonine*, as recommended by Dr. Rouander, the secretary to the Swedish Medical Association. He regards them as the most active ingredients in the cinchonas; and affirms that he has cured by their agency several cases of obstinate intermittent, which had resisted the use of sulphate of quinine and other powerful remedies. He found them likewise very useful in typhus and in states of general weakness and tendency to putrescency, where the sulphate of quinine seemed to be ineffectual. Dr. Rouander's experiments establish the belief that the tannin of the cinchonas may be instrumental in developing their full febrifuge powers.² The tannate of quinine is also a cheaper remedy than the sulphate.

On separating the quinine from cinchona by means of acids, a *resinous constituent of the bark* remains behind, which affords no more quinine, but yet possesses considerable febrifuge power, and on that account has been much used by the Dutch physicians. Two grains of this residuum are said to act as well as one grain of quinine. Truessink adduces a series of observations of different physicians, all of which confirm this, and he cites the experience of American physicians with the residuum. According to Chapman,³ a grain of this may be given every two hours during the apyrexia, in the form of pill. Strathing ascribes its efficacy to the quinine still contained in it. In Italy, several physicians have found the mother waters or lees after the preparation of quinine, when boiled to the consistence of syrup, very efficacious in intermittents; and Roux recommends it highly for practice amongst the poor. Buchner advises the lees, evaporated to dryness—which he terms *Chininum Resino-sulphuricum*—to be introduced as a cheap, and, at the same time, efficacious preparation of cinchona, which may be used in charitable institutions, rubbed with

¹ Dublin Journal of Medical Science, Sepr. 1836.

² Revue Médicale, Mai, 1837, and Amer. Med. Intelligencer, Oct. 16, 1837, p. 270.

³ Elements of Therapeutics, 6th edit. ii. 292. Philad. 1831.

sugar as a powder, or dissolved in alcohol, in place of the sulphate of quinine. These experiments and propositions, as Riecke¹ observes, merit more consideration than they have yet received; for the quinine, notwithstanding its price is much less than formerly, is yet so dear, that its administration does not adapt it well for charitable institutions, whilst the residue, which possesses valuable properties, is generally thrown away, and in this manner the price of the quinine is enhanced.

Sertürner² thinks he discovered, besides the quinine and the cinchonine, other alkaloids of cinchona, especially one, which he calls Chiniodine, or Chinoidine, and which excels in medicinal properties all the other preparations of cinchona. Henry and Delondre—the French chemists—affirm that the chiniodine is nothing more than quinine, cinchonine, and a peculiar yellow resinous matter, intimately adherent to that alkaloid. It appears, also, from the experiments of different physicians with the presumed new alkaloid, that it essentially resembles the preparations already mentioned in its medical properties. A *Resina Chinæ Præparata* is recommended by Plagge, which is prepared from the mother waters or lees of the quinine, by means of precipitation by a carbonated alkali, extraction by alcohol, and removal of the alcoholic liquor by distillation. It is said, likewise, to possess markedly curative powers in intermittents.

The Pharmacopœia of the United States gives a formula under the title *Quiniæ Sulphas Impurus*, which consists in evaporating the liquor poured off the crystals of sulphate of quinine to the consistence of a pilular mass. This has been known for years in Philadelphia under the name of Extract of Quinine, and its active ingredients appear to be sulphate of quinine and sulphate of cinchonine, which are prevented from crystallising by a peculiar resinoid substance united with them.

Dr. Wood³ asserts, that he has seldom found intermittents resist twenty-four grains of the impure sulphate, given between the paroxysms; although a larger quantity may be employed with safety and greater certainty of success. We have never prescribed it.

¹ Die neuern Arzneimittel, u. s. w. S. 130.

² Hufeland's Journal, Jan. 1829.

³ Art. *Quiniæ Sulphas Impurus*, in Wood and Bache's Dispensatory.

SALICINA.

French.—Salicinum, Salicine, Salicin.

German.—Salicin.

The tonic virtues of the bark of the willows have been known for ages, and it has been regarded as one of the best substitutes for the cinchona in eleemosynary institutions. It was not much valued, however, in more modern times, until the discovery of an active principle in it again attracted to it the attention of practitioners. This discovery if not made, was perfected, by Leroux,¹ an apothecary at Vitry, in France, who first obtained the salicine in a pure state in 1828, after it had been procured in an impure form by some German and Italian chemists.² It is prepared, by preference, from the *Salix helix*, but it is found likewise in the barks of other varieties of the willow—the *Salix alba*, *S. vitellina*, *S. purpurea*, *S. lambertiana*, *S. pentandra*, *S. polyandra*, *S. fragilis*, *S. viminalis*, &c., and in the leaves and barks of several varieties of poplar,—the *populus tremula*, *P. tremuloides*, *P. alba*, and *P. græca*.³

METHOD OF PREPARING.

According to the method of Leroux, three pounds of dried and powdered willow bark (*salix helix*) are boiled for three quarters of an hour in fifteen pounds of water, to which four ounces of subcarbonate of potassa have been added. To the cold decoction are added two pounds of liquid subacetate of lead. The mixture is permitted to settle, is filtered, treated with sulphuric acid, and the remaining lead precipitated by a stream of sulphuretted hydrogen gas. The excess of acid is neutralised by carbonate of lime: it is then again filtered, the fluid inspissated, and neutralised by dilute sulphuric acid. It is deprived of its colour by ivory black, and filtered whilst boiling. It is then twice crystallised—if still coloured after the first crystallisation—and dried in obscurity. This process yields about an ounce of salicine.

Braconnot⁴ obtains it by adding subacetate of lead to a decoction of the bark, precipitating the excess of lead by sulphuric acid, eva-

¹ *Annales de Chimie*, &c. xliii. and *Journal de Chimie Médicale*, tom. vi.

² *Dictionnaire de Mat. Méd.* par Méral & De Lens, art. Salicine.

³ *Riecke*, *Die neuern Arzneimittel*, S. 365.

⁴ *Journal de Chimie Médicale*, Janvier, 1831.

porating the colourless liquid that remains, adding near the end of the process a little animal charcoal previously washed, and filtering the liquor while hot. The salicine is deposited, on cooling, in a crystalline form.¹

The following plan has been advised by Messrs. Fisher and Tyson, of Baltimore.² Willow bark is boiled with caustic lime in water; the decoction is filtered and sulphate of zinc added, so long as it produces a precipitate. The liquid, having been again filtered, is evaporated to the consistence of an extract, and the residue is treated with alcohol. The tincture, thus obtained, if carefully evaporated, yields crystals of salicine, which may be purified by washing with a saturated solution of the same principle, in cold water.

Salicine forms very fine silky masses of white crystals, which have the appearance of mother of pearl. It bears a distant resemblance to the sulphate of quinine, yet it is not so loose and delicate. It is permanent in the air, inodorous, and has a strong, enduring bitter taste, with a striking accompanying balsamic flavour, like the bark of the willow.³ One hundred parts of cold water dissolve six parts of salicine. In warm water it is more soluble, and also in alcohol; but it is not soluble either in ether or the essential oils. It exhibits no alkaline reaction. By admixture with sulphuric acid salicine acquires a beautiful red colour.

EFFECTS ON THE ECONOMY.

The well known effects of the barks of the willows gave occasion to the immediate employment of salicine in cases of intermittent fever. Miquel⁴ appears to have been one of the first—if not the first—who instituted experiments with it; and he satisfied himself, that it merits a distinguished place amongst our febrifuge agents, although it requires larger doses than the quinine. Soon afterwards it was given by other physicians—by Husson and Bally, Girardin, Magendie, Blaincourt, Graff, Linz, Stegmayer, Amelung, Stam, Galama, Van Sneek, Blom, Gräfe, Von dem Busch, Kromholz, Pleischl, and others.

¹ For Peschier's method, see *Annales de Chimie*, vol. xlv. and *Amer. Journ. Med. Sciences*, May, 1831, p. 256.

² *Journal of the Philadelphia College of Pharmacy*, iii. 214.

³ MM. Pélouze and Jules Gay Lussac, in *Annales de Chimie*, vol. xlv.

⁴ *Gazette Médicale de Paris*, Janv. 1830; see, also, *Annales de Chimie*, xliii. and xlv.

The sentiments, respecting its value, are discrepant ; some classing it far beneath the quinine, whilst others assign it even a higher position. Its general properties are certainly analogous to those of quinine ; but it in no respect merits a preference,¹ not even in the article of price : for, although an equal weight of salicine may cost less, it requires so much more to produce the same effect, that the cost is perhaps equal.

Still as M. Pleischl,² of Prague, has suggested, even if the salicine were much the dearer of the two, it might be better to use it, because it is of home manufacture, and can be obtained in war as well as in peace.

MODE OF ADMINISTERING.

The ordinary dose of salicine, in a case of intermittent, is about four or six grains every three hours during the period of intermission ; in the febres larvatæ, or masked fevers, smaller doses may be given, but in the very violent fevers at Calvi, in the Island of Corsica, Levy found it often necessary to give from forty to fifty grains in the twenty-four hours.

Of thirty cases of quotidian and tertian intermittents, twenty were cured by the use of the salicine ; ten required afterwards the sulphate of quinine.

He considers it to be preferable to the sulphate of quinine in intermittents that are accompanied by irritation in the primæ viæ : he never saw it rejected or produce vomiting ; and in cases of manifest irritation of the digestive tube, it has been borne perfectly well.³

Salicine is generally given in intermittents, in the form of powder. In other affections, to obtain its febrifuge or tonic agency, one or two grains may be given four or five times a day—gradually augmenting the dose.

In cases of asthenia of the digestive organs, Von dem Busch prescribes a powder of salicine and sugar, with the addition of cinnamon ; and lozenges of salicine, sugar, gum arabic, and oil of

¹ Richelot, in Archives Générales de Médecine, Sepr. 1833 : see, also, Prof. Dierbach, in Heidelb. klinisch. Annal. B. x. H. 1. S. 62. Heidelb. 1834.

² Medicinisch. Jahrbücher des k. k. ö. Staat. 1835 ; and Br. and For. Med. Rev. for Apl. 1836, p. 576.

³ Archives Médicales de Strasbourg, and Gazette Médicale de Paris, Févr. 25, 1837.

peppermint. In cases of copious secretion from the mucous membranes, especially in chronic bronchitis and leucorrhœa, he directs the salicine to be combined with a decoction of the polygala amara, or of the lichen islandicus. In intermittents, Stegmayer advises it to be associated with small doses of tartrate of antimony and potassa.

Pulveres Salicinæ.

Powders of Salicine.

℞. Salicin. gr. xij.
Sacch. alb. ℥ij. Misce

et fiat pulvis in partes iv æquales dividendus.

Dose.—One, three times a day.

KROMBHOLZ.

Pulveres Salicinæ Compositi.

Compound Powders of Salicine.

℞. Salicin. gr. xv.
Antim. et potass. tartrat. gr. j.
Sacchar. alb. ℥iiss. Misce

et fiat pulvis, in partes x æquales dividendus.

Dose.—A powder, every two hours.

STEGMAYER.

Mistura Salicinæ.

Mixture of Salicine.

℞. Rad. polygal. amar. ℥vj.
Coque cum aquæ fontanæ ℥xij. ad remanent. ℥viiij.
Colaturæ adde

Salicin. gr. viij. ad x. M.

Dose.—One or two spoonfuls every two hours.

VON DEM BUSCH.

SAPO COCONEUS.

SYNONYMES.—Soap of the Cocoanut Oil, Sapo Cacaotinus.

French.—Savon de Cacao.

German.—Cocosnussölseife.

This soap has been much employed in Europe, of late years more especially, as a cosmetic, and it seems well adapted for the purpose, except for its peculiar odour, which is by no means agreeable, but may be masked by the addition of some sweet-scented oil. Our object in mentioning it here is to state, that the veteran Hufeland

extolled it highly as an efficacious and innoxious application in herpes, not only from numerous trials of it made by himself, but by others, and he affirms, that when it does not effect a cure, it allays the distressing burning and itching.

The soap is dissolved in warm water, and the affected part washed with it three or four times a day.

SAPO MOLLIS.

SYNONYMES.—Sapo Viridis, S. Niger, S. Kalicus, Soft Soap.

French.—Savon Noir, Savon Mou.

German.—Schmierseife, Grüne Schmierseife.

Under this name a soap is used, which is formed by a union of oil with potassa. It is the "*sapo ex oleo et potassâ confectus*" of the London Pharmacopœia, and has of late been brought forward in Germany as a remedial agent in cases of itch,¹ and has been employed in many hospitals.

MODE OF ADMINISTERING.

The treatment of itch by soft soap is directed by Pfeuffer to be carried into effect in the following manner.

Attention is paid to the general health of the patient for a day before the soap is applied. His whole body, with the exception of the head, face, and genital organs, is then besmeared with it, and the application is repeated, morning and evening, for six days. According to the extent of surface of the patient's body, at first two rubbings, of from four to six ounces, are used; at the third and fourth, from two to three ounces, and from the fifth to the seventh inclusive, from half an ounce to an ounce; but after this, the soap is applied only to those parts which are affected with the eruption or itching. On the eighth day the patient takes a bath of tepid soap and water, and the body and bed linen, which have not been shifted during the cure, may now be changed for cleaner. In dry and warm seasons, the patient is able to leave the infirmary on the tenth day, cured; but in moist and cold, not until the twelfth or

¹ Pfeuffer, Beobachtungen über die Krätze und ihre Behandlung durch die Schmier- oder grüne Seife. Bamberg, 1833.

fourteenth. The cure of the eruption is generally effected in seven days, that is, by fourteen rubbings. During the period of treatment, the patient must remain in bed, avoid exposure to draughts of air, and reside in a chamber whose temperature is from 73° to 77° of Fahrenheit.

On account of the strong smell of the soap, not more than ten patients ought to be permitted to occupy the same room. A full diet may be allowed them.

From six to eight hours after the first or second rubbing, a sense of tension and pricking is felt in the skin, which, at times, gradually augments until it amounts to a feeling of burning heat. About the fifth or sixth rubbing, the skin appears of a scarlet hue, without the temperature being materially elevated. In several cases, irritative fever ensues, which disappears in the course of twenty-four hours, with augmented secretion of urine. Miliary vesicles form in groups; sweating takes place freely; the sleep which may have been disturbed for a night or two recurs; the skin desquamates, and the patient does not find his strength in the least exhausted. Should the inflammation of the skin occur earlier than the sixth rubbing, the friction must be pretermitted. Pfeuffer, however, never observed this to be the case.

In scrofulous and syphilitic dyscrasies, it may happen, that the friction will have to be repeated once more, and that the patient may have to remain from two to four weeks in the institution.

It very generally happens, that this plan excites inflammation of the skin and desquamation of the cuticle: when this is not the case, no change whatever is produced in the eruption.

In order to mitigate the distressing feeling of burning produced by the rubbing, one part of flowers of sulphur may be added to two parts of the soft soap.

In those cases, in which the disease has existed for years, with greater or less intervals, and in those who were strumous in their youth, or were at a subsequent period affected with syphilis;—in all cases, indeed, in which the cutaneous affection has become, as it were, habitual, Pfeuffer directs, that a cathartic should be premised, and that in the course of the cure, a quart of the decoction of the woods should be taken.

This mode of treatment, according to Pfeuffer, is contra-indicated by febrile conditions, especially of the synochal kind; acute cutaneous affections; pulmonary and abdominal catarrhs; pulmonary and abdominal phthisis; chronic headach; and hereditary or acquired tendency to epilepsy. In such cases, he prefers the

internal and external use of sulphur ; and, after the cure, the establishment of issues.

The great recommendation of this plan of treatment, in hospitals and infirmaries, is said to be its cheapness, although it strikes us, that there cannot be any marked difference in this respect between it and the treatment by sulphur, which is greatly used, on this very ground, in many of the eleemosynary establishments of Germany at this time.¹

The efficacy of Pfeuffer's plan of treatment has been confirmed by numerous observers,—by Graff, Bermann, and Cramer, who is said to have first recommended the soap in scabies ; and by Sicherer, Seyffer, Cless and others, all of whom agree as to its excellence ; they regard it as one of the best methods of treatment in use.

SECALE CORNUTUM.

SYNONYMES.—Ergota, Clavis Secalinus, Calcar, Secalis Mater, Secale Luxurians, Ustilago, Clavis Siliginis, Spurred Rye, Corned Rye, The Spur, Ergot, Hornseed.

French.—Seigle ergotée, Blé cornu.

German.—Mutterkorn, Gebärpolver.

The effects, which this substance is capable of exerting on the uterus, are so well known as not to need any lengthened description. Its employment in parturition having been first revived in this country, there are but few who are ignorant of its reputed properties. Certain effects have, however, been ascribed to it, in very recent times, which require mention.

The spurred rye or ergot—the latter being the common name it bears from its “spurred” appearance²—is generally considered to be the result of a disease in rye, occurring most frequently when a hot summer succeeds a rainy spring.

Decandolle, however, regards it as a parasitic fungus, and calls it *Sclerotium clavus* ; whilst Leveillé esteems it to be a fungus giving a coating to the diseased grain—the medical virtues residing in

¹ H. Vezin, Ueber die Krätze und ihre Behandlung nach der englischen Methode, Osnabrück, 1836. See, also, American Medical Intelligencer, Aug. 15, 1839, p. 158.

² French, *ergot*, “a spur.”

the coating. This fungus he calls *Sphacelia segetum*. Brande refers it to the natural order, *Fungaceæ*, and terms it *Spermoëdia clavus*, and in the last edition of the *London Pharmacopœia*, it is referred to the *Acinula clavus* of Fries;¹ but, according to Lindley, Fries has no such plant in any of his works, and the only species of *acinula* known, *acinula candicans*, is found on the rotten leaves of the common alder, and among melting snow; its organization is of another kind from that of the *spermoëdia*; and Fries, who regards the other as a morbid state of the grain of certain grasses, considers *acinula* as a true fungus.²

Recently, Mr. Smith and Mr. Quekett have maintained, that the ergot is not a fungus, but a diseased state of the grain occasioned by the growth of a fungus not previously detected: to this fungus Mr. Quekett gives the name *Ergotætia*³ *abortans*.⁴ By the microscope, they discovered sporules, sporidia, or jointed bodies, which appeared to be the reproductive particles of the fungus.

EFFECTS ON THE ECONOMY.

The effects produced on the animal economy by the ergot, when eaten as food, are extremely injurious: the aggregate of the symptoms has been termed *Ergotism*. At times, they are limited to vertigo, spasms and convulsions, with a peculiar tingling or formication in the arms and legs, which has given the affection the name among the Germans of *Kriebelkrankheit*, or “creeping disease.” Most commonly, the limbs waste away, lose sensation and the power

¹ *Syst. Mycol.*

² Brande's *Dictionary of the Materia Medica*, p. 233, Lond. 1839. See, also, *Venus, Grundriss der medicin. Receptirkunst*, u. s. w. S. 347. Weimar, 1838.

³ From *ergota*, and *æria*, “cause.”

⁴ *London Lancet*, June 22, 1839, p. 465. See, also, an abridgment of a communication read by Mr. Quekett before the *Linnæan Society*, Nov. 4, 1838, with illustrative woodcuts, in *American Journal of Pharmacy*, for July, 1839, p. 116. For remarks on an insect met with in the diseased grain, see a paper by Mr. Muller, of Butler county, Pa., with comments by Dr. Carson, in *Amer. Journal of Pharmacy* for Jan., 1839, p. 269. M. Debourge considers, that the ergot is an animal product from the telephorous family. The insect deposits a liquid of its own formation on a grain of rye and produces the ergot; whence it follows, he conceives, that the ergot may be produced at pleasure by expressing this liquid upon all the grains of rye that are within a certain period of their maturity. *Sociétés Savantes*, in *Encyclographie des Sciences Médicales*, Avril, 1838.

of motion, and separate from the body by dry gangrene—constituting *gangrenous erethism* or *mildew mortification*.¹ These, however, are the toxic, not the therapeutical effects of the agent.²

The extraordinary property, ascribed to the ergot, of assisting the parturient efforts has long been credited in Germany. Its old German names, Mutterkorn (“wombgrain”) and Gebärpulver (“parturient powder”) are sufficient evidences of this notion; but, for a long time, this was rather a matter of popular than of scientific belief, although the “pulvis parturientis” of the Marburg Pharmacopœia consisted principally of ergot.

About eighty years ago, it was recommended in this country by Dr. John Stearns, of Saratoga county, New York, and since that time the weight of testimony, adduced in its favour on both sides of the Atlantic, has been overwhelming. Still, there are many distinguished individuals, who deny it all power over the uterus both in the unimpregnated and the impregnated state, and who affirm, that it acts only indirectly on that viscus through the general disturbance it occasions, and that, therefore—like every other internal agent administered as an abortive—it ought to be esteemed rather indirect than direct in its action. Such is the decided opinion of Jörg,³ whose attention has been directed to the effects produced by different medicinal agents on the sound and diseased economy, and who goes so far as to affirm, from his experiments and observations, that there is no “farther connection between these degenerate grains and the uterus, than the word *Mutter* (‘uterus’) which is common to both.”

From his various and varied experiments, Dr. Jörg infers, that the ergot, when given in small doses, produces little or no effect upon the functions; but, when fresh dried in an oven, and administered in large doses, it oppresses the stomach, occasioning nausea, vomiting, colic, liquid evacuations, destroys the appetite, and injures the digestive powers;—these effects being accompanied by a sense of weight in the head, vertigo, cephalalgia, and by general torpor of the system. Under these circumstances, he thinks, it is not difficult to understand, that the connection between the fœtus

¹ See articles, *Convulsio cerealis*, and *Ergotism*, in the Author's Medical Lexicon. Philad. 1839; and his *Therapeutics*, p. 272, Philad. 1836.

² See Christison on Poisons, 3d edit. chap. xl.

³ Dass der Gebrauch inner Reizmittel zur Beförderung der Geburt des Kindes unnöthig, fruchtlos, und gesunden Frauen sogar schädlich sei; u. s. w. S. 40. Zeitz. 1833. See, also, the author's *General Therapeutics*, p. 271.

and the uterus may be modified, and that abortion may take place.

Recently, the author has caused various experiments to be instituted on the use of the secale cornutum in doses of half a drachm and a scruple of the powder, and in the form of the oily matter referred to below. These experiments were made on both males and females; and the general effects were those described by Dr. Jörg;—when the dose was too large, nausea or vomiting often resulted, with signs of narcosis. They were made, at the author's desire, by Drs. Cottman and McKee, resident physicians at the Philadelphia Hospital.¹

Chemical analysis has thrown no light on the cause of those properties. According to the analysis of Vauquelin,² ergot contains a colouring matter of a yellowish hue; a white oily matter; a violet colouring matter insoluble in alcohol; a free acid, which is in part phosphoric; a very abundant vegeto-animal matter, which is greatly disposed to putrefaction, and furnishes much thick oil and ammonia on distillation; and a small quantity of free ammonia, which may be obtained at the temperature of boiling water.

A more recent analysis has been made by Maas,³ of Hamburg. He found it to contain gluten; ammonia or a peculiar alkali; acetic acid; a violet colouring matter; resin; fixed oil; an alkaline acetate, but neither starch, hydrocyanic acid, narcotine, nor phosphoric acid, which some had discovered in it.⁴

Its active principle is yet undetermined.

Dr. Hooker, of New Haven,⁵ found, that when a quantity of pulverised ergot was macerated for several days in sulphuric ether, and the liquid evaporated in a glass vessel until it no longer afforded the smell of ether, there remained at the bottom of the vessel a small quantity of thick heavy oil, resembling in appearance fish oil; above this was a lighter oil, much more abundant than the former, of a light reddish-brown colour, and of a sweetish nauseous taste. This light oil was found to be possessed of decidedly narcotic properties. In two experimental cases, the effects of the ergot continued apparent for nearly a week; the pupils of the eye were dilated; the pulse,

¹ American Medical Intelligencer, Sep. 1, 1839, p. 161. See, also, M. Cordier, in *Journal Général de Méd.* Avril, 1823.

² *Mémoire du Muséum*, iii. 198, Paris, 1817.

³ *Bulletin des Sciences Médicales de Ferussac*, xix. 332; and Mérat & De Lens, *Dict. de Mat. Méd. Art. Ergot*.

⁴ For Mr. Battley's Analysis, see *Lond. Med. Gaz.*, Feb., 1831, and for that of Mr. Wigger, *Lancet*, Nov. 10, 1832, from *Allgem. Med. Zeitung*.

⁵ *Boston Medical and Surgical Journal*, x. 298, Boston, 1837.

respiration, and capillary action were very slow, and the skin livid, —with loss of appetite, general languor and lassitude, and rigidity and soreness of the muscles; those of the thighs and other parts of the lower extremities being more particularly affected. For three days the pulse continued below fifty, with a proportionate infrequency of respiration.¹

In the experiments made with this substance by Dr. McKee,² he found that in every case, when given in doses of from ten to forty drops, it at first produced slight exhilaration of the spirits with increase of circulation; but these symptoms were soon followed by sedation, and in the larger doses by nausea also.

Although the ergot is capable of producing the acro-narcotic effects described above, their supervention is not desired by those, who regard it to be possessed of peculiar powers by which it causes contraction in the uterine fibres of the parturient female, and who administer it with that view.

When given in appropriate and properly repeated doses, the uterine action, they assert, becomes more energetic, and the contractions constant and almost unremitting; but there is no accompanying disorder. It has been largely administered, and in no country, perhaps, more than in this: practitioners of the greatest eminence—here and elsewhere—have placed the fullest reliance on its powers to excite contraction of the uterine fibres, and although, in many of the cases which fell under their observation, the parturient efforts might have recurred without the agency of the ergot, this could scarcely have been the case with the remainder. From the results, therefore, of these cases, we seem to be compelled to admit, that the ergot is possessed of expulsive properties by which it acts upon the parturient uterus; but that it is capable of producing any effect upon the unimpregnated uterus, or upon the impregnated at any time, except when parturition has commenced, is denied by many. The result, however, of all these observations precludes the belief, that the increased parturient efforts, resulting from its agency, are produced indirectly by violence done to the constitution of the mother, inasmuch as, in most of the recorded cases of benefit accruing from its administration, no such violence would appear to have been perpetrated. Yet, admitting the full power ascribed to the ergot in these cases, it can be rarely necessary to have recourse to it; and it is doubtless often employed, where the propriety of the

¹ See Amer. Med. Intelligencer, Dec. 15, 1837, p. 329.

² Ibid. Sept. 1, 1839, p. 161.

administration of it, or of any other agent, is extremely questionable.

But the effect produced by the ergot upon the mother has not been the only topic of interest in regard to its use in parturition. It has been maintained by many, that since its introduction, the number of the still-born has augmented, and that observation has sufficiently shown, that where it is given to expedite delivery, more or less danger always accrues to the offspring;¹ either by the induction of asphyxia, or of positive death, owing to the violence of the uterine contractions, or by the deleterious agency of the ergot on the fœtus.² But even were we to admit the prejudicial effect of the ergot on the fœtus in utero to be true—and it has been deposed to by many obstetricians—and that the number of the still-born is greater than formerly—which is, however, by no means the case—its influence could be but small, and could not account for the statistical differences that have been noticed.³

In many cases, the ergot has been largely administered, and yet the child has been born alive. Dr. James Paterson,⁴ of Glasgow, details the particulars of a case in which the enormous quantity of four ounces was given, yet the movements of the child continued lively; and he refers to an excellent paper by Professor Von Busch,⁵ of Berlin, now before us, containing a reference to one hundred and seventy-five cases in which the secale cornutum was given on account of deficient labour-pains. One hundred and seventy-seven children were born; of these one hundred and forty-two were born alive; eighteen in a state of asphyxia which was removed by appropriate treatment; and seventeen still-born. Of the seventeen dead, seven had evidently died before labour, and were more or less putrid; and ten during labour; of these, two lost their lives from turning; one from presentation of the breech; two from prolapsus of the funis; one from narrow pelvis and detention of the head therein; one from the long duration of the fourth stage of labour; one from a difficult forceps case, which required perfo-

¹ Chevasse, in *Transact. of the Provincial Medical and Surgical Association*, iv. 306, Lond. 1836.

² Mojon, in *Gazette Médicale de Paris*, Janv. 19, 1839.

³ Avery, in *Transact. of the Med. Society of the State of New York*, vol. iii. Pt. 2. p. 185, Albany, 1837.

⁴ *London Medical Gazette*, June 1, 1839, p. 337.

⁵ Die gebürtshülffliche Klinik an der königlichen Friedrich-Wilhelms-Universität zu Berlin, in *neue Zeitschrift für Geburtskunde*, u. s. w. B. v. H. i. S. 107. Berlin, 1837.

ration afterwards; one from a peculiar deformity of the extremities; and one from no assignable cause: so that, of the one hundred and seventy-seven cases, there was but one which could be referred to the agency of the ergot, and there was no reasonable ground for such reference.

Dr. Frank Ramsbotham¹ who regards the *secale cornutum* as capable of exerting specific powers on the uterus at all periods of utero-gestation, and who has recently referred to several cases of premature labour induced in his own practice by its use, is disposed to conclude, that although it may bring on labour without having recourse to any operation, yet that it does not present a more likely, or indeed so probable, a means of saving the infant as the older method of puncturing the membranes; and he infers, from his experience, that whatever might have been the quantity administered, unless it exerted a decided influence over the uterus, the child suffered no detriment.²

Dr. Paterson³ and Mr. Heane⁴ have likewise administered the ergot successfully in large doses with the view of inducing premature labour. The former of these gentlemen is disposed to think, that the abortive properties of the ergot are not exerted upon the impregnated uterus at an early period of utero-gestation, but that, at a certain stage of development, the uterine fibres are capable of being excited by it so as to expel the fœtus. It would be strange were its agency to be thus restricted.

When ergot was found to be possessed of the power of exciting uterine contractions, it was philosophical to employ it in retention of the placenta, in after-pains,⁵ and in cases of uterine hemorrhage and of convulsions⁶ in the parturient state, accompanied with atony of the uterus.⁷ In such cases, means of more speedy action are needed; but still cases might arise in which the administration of ergot might be serviceable, and several such cases, attesting the services rendered by it, have been published.

It has been strongly recommended, likewise, for the prevention

¹ Lond. Med. Gaz. June 15, 1839, p. 420. See, also, *Ibid.* for June 28, 1834.

² See, on this subject, Dr. J. J. Kelso, in *Lond. Lancet*, June 22, 1839, p. 462; and Duparcque, in *Revue Médicale*, Mars, 1838.

³ Lond. Med. Gaz. June 1, 1839, p. 332. See, also, *Ibid.* Sept. 1838.

⁴ *Ibid.* Jan. 26, 1839.

⁵ Hoffman, in *Berl. Med. Zeitung*, June 29, 1836.

⁶ Duparcque, *Revue Médicale*, Mars, 1838.

⁷ Von Busch, *Op. cit.* i. 105.

of uterine hemorrhage by Stearns,¹ Dewees,² Bradley,³ Abraham,⁴ Kisch and others.

Subsequently, the employment of the ergot was extended to amenorrhœa⁵ and to uterine hemorrhage in the unimpregnated female, and many cases have been published in confirmation of its being possessed of such virtues. It was thought, also, that it might be serviceable,—and was found so by Bazzoni,⁶ Negri, and others,—in leucorrhœa, and in gonorrhœa,⁷ dysentery,⁸ &c., and again, as it proved to be useful in uterine hemorrhage, it was conceived, that it might exhibit like powers in other hemorrhages, and accordingly it was given in cases of epistaxis, hæmoptysis, hæmaturia, &c. In these last cases, it has been rarely, however, employed.⁹ The narcotic or sedative property, which it exhibits in certain cases and doses, and the sedative action, which it exerts in others, may render it serviceable in these affections, whatever may have been the process of reasoning, which led originally to its employment.¹⁰

Dr. Perrine¹¹ has published some cases of periodical diseases, in which the powder of the secale cornutum was administered with advantage during the intervals; but no further results appear to have been elicited.

M. Payan¹² thinks it demonstrated that the ergot is primarily and essentially an excitant of the spinal marrow; and he conceives, that its action on the uterus, bladder, and muscles of the lower extremities is but secondary, from a reflex action transmitted from the spinal marrow to those organs through the nerves distributed to them. He has given the details of some cases of paraplegia,

¹ Philad. Journ. of Med. and Phys. Science, v. 44.

² System of Midwifery.

³ Lancet, April 15, 1837.

⁴ Ibid, April 22, 1837.

⁵ Enriotti, in Repertorio Medico-Chirurgico del Piemonte, and Journal des Connoissances, Mars, 1838.

⁶ Annali Universali di Medicina Feb. 1831; and Ryan, Medical Formulary, p. 264, 3d edit. Lond. 1839.

⁷ Müller in Rust's Magazine, B. xl. H. iii. and Amer. Journ. of the Med. Sciences, Feb. 1835, p. 527; and Ryan, Op. cit.

⁸ Mojon, Op. cit.

⁹ Duparcque, Op. cit.

¹⁰ See some remarks on this subject, by the Author, in American Medical Intelligencer, vol. i. p. 219.

¹¹ Amer. Journal of the Medical Sciences, Nov. 1833, p. 279.

¹² Revue Médicale, Février et Mars, 1839; in Encyclograph. des Sciences Médicales, Avril, 1829.

which seemed to be relieved by the ergot; an infusion of fifteen grains in water being given at first in the course of the day, and the dose being gradually augmented.

M. Allier fils,¹ from having observed, as he believed, contraction of the fibres of the bladder under the administration of ergot, has recommended it highly in cases of retention of urine; and feels himself justified in inferring, from the results of varied observation, that it is capable of restoring to the bladder the contractility it may have lost owing to immoderate distension of its coats by accumulation of urine:—that its action has been evinced in cases in which this kind of paralysis has resisted all known therapeutical agents; and that, owing to the fugacious character of its operation, it ought to be administered at short intervals, in broken doses, and these long continued.

M. Allier recommends, that it should be commenced in the quantity of a scruple in the day, divided into six equal parts, that the quantity should be afterwards raised to forty grains, and then gradually diminished to a scruple; and afterwards discontinued by degrees in eight or ten days after the cure, to consolidate it.

MODE OF ADMINISTERING.

The great difference that has been observed in the effects of the *secale cornutum* has led to the belief, that there must be much difference in the article, and that every care must be taken to have it good. Dr. Ryan,² indeed, affirms that not one druggist or chemist in a hundred has it genuine.

It must be recently pulverised, too, if we are desirous to count upon its action when given in this form.³

When prescribed with the view of augmenting the parturient energy, it is most commonly perhaps given in powder, in the dose of from ten to twenty grains, repeated every twenty minutes until the effect upon the uterus is elicited. Professor Von Busch⁴ found the best results when it was given in the dose of ten grains at short intervals—from ten to fifteen minutes. In one case it was requisite to repeat it eight times; in four cases, six doses were sufficient; in twelve, five; in thirty-three, four, and in the remainder of the one hundred and seventy-five cases, three and less; the smallest

¹ *Journal des Connoissances Médico-Chirurgicales*, Nov. 1838.

² *Formulary*, p. 264.

³ Allier, *Op. cit.*

⁴ *Op. cit.* S. 106.

quantity exhibited was a single dose of ten grains ; the largest, nine doses of ten grains. Dr. Ryan¹ says the maximum dose is a dram and a half ; but it, obviously, cannot be thus limited.

Dr. Hooker, who considers, that the ecboic and the narcotic properties of the ergot may be separated, recommends, in these cases, the clear infusion, which possesses, he conceives, the former property only. The powder of course contains both.

Dr. Bishop, of New Haven,² asserts, that he has never seen but once any unpleasant effects from the use of the ergot, and then he gave it in powder ; the labour was protracted and narcotism induced. In New Haven, he remarks, it is the general practice to administer the infusion, and in that form it is considered safe and effective in parturition.

It is proper, however, to remark, that the form of infusion as well as of decoction was found by Dr. Jörg to be highly unpleasant to the stomach, and it could not be repeated in his experiments—which, it must be remembered, were not made on the parturient female—in large doses for any length of time, without irritating the bowels, producing loss of appetite, and general impairment of the digestive function. Notwithstanding this, we believe both the infusion and decoction to be desirable forms of administration, in the cases under consideration.

As to the form of tincture, Mr. Battley affirms, that spirit will not extract the active property, and Dr. Ryan³ states, that he has certainly found the tincture to fail in the majority of cases. Mr. Battley prefers the watery extract.

For the purpose of inducing premature labour, it has been necessary to give it in larger doses. Dr. Paterson⁴ gave it in the form of the infusion, p. 410, until the patient took six drams of the medicine. The infusion was likewise given by Dr. F. Ramsbotham,⁵ and the quantity each of his patients took varied from two to twelve drams.

When the secale cornutum is given with other views, the usual dose is 10 or 15 grains of the powder given three or four times a day : the results of the observations of Dr. Cottman⁶ have shown however, that in 30 grain doses its sedative effects are more marked.

¹ Op. cit.

² American Medical Intelligencer, Dec. 15, 1837, p. 330.

³ Op. cit. p. 266.

⁴ Lond. Med. Gaz., June 1, 1839, p. 333.

⁵ Ibid, June 15, 1839, p. 421.

⁶ American Medical Intelligencer, Sept. 1, 1839, p. 161.

This, too, was the dose in which it was administered by Dr. Hooker. In such cases, the tincture, and the light oil described by Dr. Hooker may also be prescribed: the latter in the dose of ten to thirty drops.

Infusum Secalis Cornuti.

Infusion of Ergot.

- ℞. Secalis cornuti, ℥j.
Aquæ ferventis, ℥iv.

Infunde.

Dose.—One third, to be repeated every 15 or 20 minutes, in deficiency of uterine contractions.

- ℞. Secalis cornuti, ℥ss.
Aquæ ferventis, ℥xxiv.

Colaturæ adde

Syrup. simpl. ℥j.

Dose.—Two ounces every three or four hours, to induce premature labor.

PATERSON.

- ℞. Secalis cornuti, ℥ss.

Infunde per semihoram in

Aquæ bullientis, ℥iss. et cola.

This quantity to be taken for a dose, and repeated every four hours.

F. RAMSBOTHAM.

Decoctum Secalis Cornuti.

Decoction of Ergot.

- ℞. Secalis cornuti, ℥j.
Aquæ, Oijss.

Coque ad Oij. et cola.

Dose.—A table-spoonful every quarter of an hour.

Tinctura Secalis Cornuti.

Tincture of Ergot.

- ℞. Secalis cornuti, ℥ijss.
Spirit. tenuioris, Oj.

Macera per dies quatuordecim et cola.

Dose.—Twenty minims to two drams, two or three times a day, as a sedative agent.

GUY'S HOSPITAL.

Pulveres Secalis Cornuti Compositi.

Compound Powders of Ergot.

(Antihemorrhagic Powders.—RYAN.)

- ℞. Secalis cornuti, ℥ss.
Pulv. cinnam. comp. ℥ss.
Sacch. purif. ℥ss.

M. et divide in chartulas x.

Dose.—One every hour or every second or third hour in active hemorrhage from any outlet. In leucorrhœa and gleet, one may be given three or four times a day, and should they fail the following may be substituted.

℞. Secalis cornuti, ℥ij.
 Pulv. cubebæ. ʒj.
 P. cinnam. c. ʒss.
 Sacchar. purif. ʒj.

M. et divide in chartulas viij.

Dose.—One, three or four times a day.

RYAN.

SODÆ CHLORIDUM.

SYNONYMES.—Soda Chlorinata, Sodæ Chloruretum, Chloruretum Oxidi Sodii, Sodæ Oxymurias, Natrum Chloratum, N. Chloricum, N. Oxymuriaticum, Chloride of Soda, Hypochlorite of Soda, Labarraque's disinfecting Liquid; Chloruret of Soda, Chlorite of Soda, Chlorinated Soda.

French.—Chlorure de Soude, Chlorure d'Oxide de Sodium.

German.—Chlornatron.

This preparation resembles in almost all respects the chloride of lime. (See Calcis Chloridum p. 83.) Both it and the chloride of potassa were associated by Berthollet under the common name *Eau de Javelle*, or bleaching liquor, and it has of late generally received the name of *Liqueur de Labarraque*.

METHOD OF PREPARING.

Labarraque¹ recommended it to be prepared directly by passing a current of chlorine into a solution of subcarbonate of soda.

The following is the formula, in the last London Pharmacopœia, for the *Liquor Sodæ Chlorinatæ*, the *Liquor Sodæ Chloridi*, *Aqua Natri Oxymuriatici*, *German*, Oxydirt-salzsaures Natronwasser, or Labarraque's disinfecting liquid. "Take of carbonate of soda, a pound; distilled water forty-eight fluid ounces; chloride of sodium, four ounces; binocide of manganese, three ounces; sulphuric acid, four ounces. Dissolve the carbonate of soda in two pints of the water; then put the chloride of sodium and binocide of manganese, rubbed to powder, into a retort, and add to them the

¹ Gazette de Santé, April 25, 1826.

sulphuric acid, previously mixed with three fluid ounces of water, and cooled. Heat, and transmit the chlorine first through five fluid ounces of water, and afterwards into the solution of carbonate of soda above directed."

When the solution of chloride of soda is properly prepared, it has a yellow colour, a sharp, saline, and astringent taste, and an odour of chlorine. By careful evaporation, it yields crystals which produce the original liquid when re-dissolved. When the solution is exposed to air, and allowed to evaporate spontaneously, it gives out chlorine, and yields crystals of carbonate of soda.¹

EFFECTS ON THE ECONOMY.

In its general remedial agency, the chloride of soda resembles the chloride of lime, and has been administered both internally and externally in the same cases. It is preferred, however, for internal, whilst the chloride of lime is generally chosen for external, use.

By Bouillaud, Chomel and others it has been given, with advantage, in typhous fevers; and by Kretschmar,² Lalesque, Colson, and Gouzzée³ in intermittents:⁴ ten cases are reported by the last named gentleman; in two, the intermittent yielded immediately; two others were cured after a slight return; in one there were four attacks, gradually diminishing; in two cases, the severity of the paroxysms abated, but it was thought necessary to have recourse to the sulphate of quinine; in two others, no effect was produced, and in one, the disease was aggravated. Gouzzée infers, that these cases prove the febrifuge properties of the chloride of soda to be less marked than those of the sulphate of quinine, and, therefore, that it ought not to be trusted to, except in the slighter cases, and where the patients are easily susceptible of the effects of medicine,—as women and children.

In like manner, it has been found useful in scrofulous affections, and in various diseases in which the chloride of lime has proved serviceable. See *Calcei chloridum*.

¹ Faraday, *Quarterly Journal of Science*, N. S. ii. 84, cited by Brande, *Dictionary of the Materia Medica*, p. 508, Lond. 1839.

² Venus, *Grundriss der medicin. Receptirkunst*, S. 67. Weimar, 1838.

³ *Revue Médicale*, Février, 1836.

⁴ Riecke, *Die neuern Arzneimittel*, S. 334.

MODE OF ADMINISTERING.

From ten drops to a dram may be given internally for a dose, mixed with plain or sugared water.

The form in which it was prescribed by Gouzée, in intermittents, was a mixture, composed of half a dram of the chloride to four ounces of distilled water. This was taken by spoonfuls during the apyrexia; so that the last dose should be swallowed shortly before the next paroxysm was expected. The patients were restricted to their beds, or at least to their chambers.

When applied externally, it is rarely used pure or diluted with so little as one half water, except in cases of asphyxia, and gangrene, and for dressing old ulcers, &c. Most commonly it is diluted with five to ten parts of water, and in this strength is applied to ulcers of various kinds, burns, cutaneous diseases, &c. When used as a disinfecting agent, it is most commonly diluted with ten, twenty or thirty times its weight of water.

SPILANTHUS OLERACEUS.

SYNONYMES.—Spear-leaved Spilanthus.

French.—Cresson de Para.

German.—Falsche Fleckblume.

This plant, which is a native of South America, being an annual of very rapid growth, succeeds well in the climate of the United States. A tincture of it has been much recommended in France and Germany, as an arcanum, in toothach. Of late, its preparation has become known. Riecke¹ terms it the *Tinctura Spilanthi oleracei composita*, (Paraguay—Roux, Paratinktur.) It is prepared in the following manner. Take of the leaves and blossoms of the inula bifrons—a species of elecampane growing in Italy and the southern Pyrenees—one part; the blossoms of the spilanthus oleraceus, obtained from South America, and from which the Drs. Bahi formerly made their *elixir odontalgicum*, four parts; roots of the anthemis pyrethrum, one part; alcohol at 33° (s. g. .863) eight parts. The solid matters are divided into small pieces, and

¹ Die neuern Arzneimittel, S. 395.

with the alcohol are placed in a flask for digestion, which is closed ; the mixture is suffered to digest for a fortnight, at the expiration of which time it is filtered, and then preserved in closed vessels.¹

This tincture is said to relieve toothach instantaneously, when applied to the gums and tooth, and Hufeland affirms, that multitudinous experiments in Berlin have proved its value. If the relief be transient, the application must be repeated. It contains nothing narcotic, or which can injure the teeth ; and consequently no unusual precaution is requisite in its use.

Heyfelder, who often tried it, considered it very uncertain,—at first affording relief, but afterwards none at all.

STRYCHNINA.

SYNONYMES.—Strychninum, Strychnia, Strychna, Strychnine, Vauqueline.

French.—Strychnine.

German.—Strychnin.

This alkaloid was discovered by Pelletier and Caventou² in the nux vomica, St. Ignatius's bean, upas tieuté, and in the wood of the strychnos colubrina ; and experiment has shown, that these substances are indebted for their medicinal properties to it.³

In those different substances, strychnine is found associated with another principle analogous to it in its properties—brucine.⁴ In the St. Ignatius's bean, there is less brucine than in the nux vomica, so that it is best adapted for the preparation of strychnine ; but it is not as easily obtained, and consequently the nux vomica is almost always—if not always—used.

METHOD OF PREPARING.

A solution of liquid subacetate of lead is added to a solution of the alcoholic extract of nux vomica in water, until a precipitate is no longer thrown down ; the foreign matters being thus precipitated, the strychnine remains in solution with a portion of colouring matter, and sometimes an excess of acetate of lead. The lead is

¹ Journal de Pharmacie, ix. 586.

² Annales de Chimie, Tom. viii. ix. & x.

³ Magendie, in Annales de Chimie, x. 176, 1819.

⁴ See page 92.

now separated by sulphuretted hydrogen; and the fluid is filtered and boiled with magnesia, which unites with the acetic acid, and precipitates the strychnine. The precipitate is next washed in cold water, and re-dissolved in alcohol to separate it from the excess of magnesia, and by evaporating the alcohol, the strychnine is obtained. If it be not perfectly white, it must be re-dissolved in acetic or hydrochloric acid, and reprecipitated by means of magnesia.

Strychnine, obtained by crystallisation from an alcoholic solution, which has been diluted by means of a small quantity of water, and left to itself, appears under the form of microscopic crystals, constituting four-sided prisms, terminated by pyramids with four flattened or depressed faces. When crystallised rapidly, it is white and granular, is insupportably bitter to the taste, and leaves an after taste similar to that caused by certain metallic salts; it has no smell, and is not changed by exposure to the air; is neither fusible nor volatile; for, when subjected to the action of heat, it does not fuse until the moment of its decomposition and carbonisation, and it is decomposed by a degree of heat inferior to that which destroys most vegetable substances. When exposed to the naked fire, it swells, becomes black, and yields an empyreumatic oil, a little water, acetic acid, carbonic acid, and carburetted hydrogen. Distilled with deutoxide of copper, it gives out much carbonic acid, and only slight traces of azote. It is composed, therefore, of oxygen, hydrogen and carbon.

Although strychnine has so strong a taste, it is scarcely soluble in water. At 50° Fahr., 6667 parts of water dissolve but one of it; boiling water dissolves a little more than double, so that it may be said to be soluble in 2500 parts of boiling water. It is remarkable, however, that a solution, made in the cold, and containing, therefore, only $\frac{1}{6667}$ th part of its weight, may be diluted 100 times, and still retain a very decidedly bitter taste. It is pretty soluble in strong alcohol, little so in weak, and not greatly so in ether or fixed oils, although they acquire a bitter taste from it. On the other hand, it is very readily soluble in volatile oils, and the hot saturated solution, on cooling, deposits crystals. It has an alkaline reaction, and forms, with acids, salts which are mostly crystallisable, and insupportably bitter, and are more soluble than pure strychnine.¹

¹ Magendie's Formulaire, &c.

EFFECTS ON THE ANIMAL ECONOMY IN HEALTH.

The effects of strychnine on man and animals resemble, on the whole, those of the spirituous extract of *nux vomica*, except that they are more intense. According to Magendie, one eighth of a grain is sufficient to kill a strong dog. Pope, who made experiments on dogs, found, that $\frac{1}{12}$ th of a grain was enough to paralyse the lower limbs of a small dog in four or five minutes, and in half an hour to kill it. Christison¹ considers strychnine the strongest poison after the hydrocyanic acid. He injected a solution of a third of a grain in alcohol into the thorax of a wild boar, and in ten minutes the animal died. A dog was destroyed by $\frac{1}{6}$ th of a grain in two minutes; and he believes that the same effect would be induced on man by half a grain introduced into a wound.

Lembert² observed similar results from placing a grain in the thorax of a small dog, and from three grains introduced into the cellular tissue of a larger animal, on which tetanic spasms were induced in the thoracic muscles.

Mr. Blake³ injected a grain of strychnine, dissolved in a small quantity of acetic acid, into the veins of a dog. The first effect of the poison was to induce general convulsions in about thirty seconds after its injection, the action of the heart being at the same time rendered irregular, which Mr. Blake presumes was owing to the convulsive struggles of the animal. All external signs of life ceased in about a minute and a half after the injection of the poison—the heart still continuing to beat. He found, that when strychnine was introduced into the circulation in so small a quantity as not to produce any general symptoms, it did not appear to exert the least influence on the heart.

That the action of strychnine is analogous to that of the *nux vomica*, has been proved by the experiments of Ségalas,⁴ Andral,⁵ Bardsley,⁶ Redlich, Sandras, Lüders, Hennemann and numerous others.⁷ It affects especially the spinal marrow and the ganglionic system,—less strikingly the brain; small doses excite the gan-

¹ Treatise on Poisons, 3d edit. Edinb. 1836.

² Essai sur la Méthode endermique, Paris, 1828, 8vo.

³ Edinburgh Medical and Surgical Journal, Apl. 1839, p. 338.

⁴ Magendie's Journal de Physiologie, ii. 4.

⁵ Ibid, Juillet, 1823.

⁶ Hospital facts and observations, illustrative of the efficacy of strychnia, brucia, &c. Lond. 1830.

⁷ Pétrequin, Gazette Médicale de Paris, No. 44, Nov. 1838.

glionic system; larger, the spinal marrow; consequently, it has been properly imagined, that it might be an efficacious remedy in nervous diseases, which are dependent upon spasmodic disorder in the ganglionic system, or on diminished sensibility and torpor of the nerves of motion.

The following are the effects observed by Oppler from the internal use of the nitrate of strychnine:—a sensation of warmth and itching in the epigastrium; eructation; nausea; vertigo; slight excitement like that of intoxication; great vividness, with more or less confusion of mind; dull pain over the eyes; spots before the same; dilatation of the pupils; diplopia; tinnitus aurium; difficult articulation and deglutition; slight trismus; sense of formication in the paralysed parts; convulsive motions or twitchings, at times in those parts, at others over the whole body, similar to electric shocks; tremors of the muscles; occasionally violent spasms; tetanus; asthma; palpitations; febrile heat; general sweating; prostration; pale or livid countenance; pulse, sometimes full and frequent, at others small and contracted; great sensibility over the whole body; involuntary laughter, succeeded always by difficulty of breathing and convulsions. The sleep was generally interrupted by convulsions; the secretion of urine scanty, and occasionally suppressed. These symptoms came on gradually, and disappeared in the same manner, when the dose was moderate, in the course of some hours. Large doses induce death by a sudden shock to the nervous system; smaller doses, when continued for a long time, may destroy by causing apoplexy, of which Oppler saw many examples in his experiments on animals.¹

Dr. Blumhardt, of Stuttgart,² has published a case of poisoning by strychnine, which occurred to him in Stuttgart, and which is perhaps the only fatal case on record, of which we have the details. He was called to a young man, seventeen years old, who had swallowed two scruples of strychnine after his dinner. A short time afterwards, experiencing great restlessness, he repented of what he had done, and immediately took four grains of tartar emetic, which excited considerable vomiting. When the physician arrived, about a quarter of an hour after he had taken the strychnine, he found the patient on his back in bed, with his head thrown

¹ See, also, Tanquerel des Planches, *Essai sur la Paralysie de Plomb*. Paris, 1834.

² Medicinisch. Correspondenz-Blatt, in *Encyclog. des Sciences Médicales*, Sept. 1837.

back, rigid and incapable of motion, but with a constant inclination to turn towards the right side. He could only move the upper limbs freely. The countenance was pale and haggard; the temperature of the skin natural, and the pulse quick and contracted. Consciousness remained unaffected; the speech was rendered difficult by an occasional contraction of the muscles that move the lower jaw; but it could not properly be said to be interrupted; deglutition was untouched. The trismus, however, became more and more frequent and violent, and the respiration thereby unequal and suspended; the pulse was small, suppressed and quick. The remedies—employed to save him—as the tincture of iodine and the acetate of morphine were of no avail. With the periodical trismus was now associated spasmodic agitation of the whole body, to which—after a short interval—succeeded opisthotonos with violent symptoms of suffocation; the trismus attained the highest degree, and the upper extremities were deprived of the influence of volition. With the increase of the general tonic spasm, the respiration was always more difficult and oppressed, and for a time wholly ceased; the pulsation of the heart and arteries became irregular, less distinct and at length imperceptible. In this condition, the skin acquired a bluish appearance; the countenance was puffed, and of a violet hue; the lips dark blue, the neck swollen, the eyes protruded, fixed and directed towards the right side; the pupils enlarged, and immovable, and the conjunctiva injected. At this period, the patient was entirely unconscious; but from this condition he awoke once, and all the symptoms became mitigated; during this remission, the muscles, influenced by the spinal marrow, remained cramped, except the upper extremities, which could be moved voluntarily. In a quarter of an hour, the tetanic attack returned in its violence, with intense commotion of the whole body; this ended in asphyxia, from which he again recovered to consciousness. The same thing happened in a third attack. In the fourth, he succumbed under the power of the poison. The whole scene from the taking of the poison to the occurrence of death lasted an hour and a half.

During the last attack, as doubt existed whether he was really dead, the median vein of the left arm, which was turgid, was opened, and after the vessel was emptied of its thick, black blood, which resembled that of an animal, several bubbles of air, from the size of a pea to that of a small cherry, were forced out by pressure.

The dissection was made twenty hours after death. In spite of the elevated summer heat there were no signs of putrefaction; the

whole body was uncommonly rigid. The muscles of the back were of a brownish red colour, almost like that of smoked meat. On opening the spinal canal, a considerable quantity of thick, dark coloured blood, like that of an animal, flowed out.

The *plexus venosi spinales* were turgid with the same kind of blood, as well as the vessels of the pia mater. Under this membrane, especially in the cervical portion, some watery fluid was effused. The upper portions of the spinal marrow were soft, even pappy in some places, but lower down it became gradually harder. Within the cavity of the cranium, the same turgid condition of vessels existed; all the veins of the dura mater appeared as if injected; the veins of the pia mater were likewise engorged; and the whole mass of the brain indicated an unusual supply of blood, so that the cortical substance appeared quite blue. The cerebellum was softer than usual. In the cavities of the abdomen and thorax, a striking poverty of blood was perceptible. The heart was shrunken and empty, as well as the large vessels of the thorax. The stomach was full of solid food, which appeared to have undergone no change: its blood vessels contained a considerable quantity of blood, and the mucous coat exhibited marked redness over its whole surface; but it was especially concentrated about the cardia and the fundus; the small intestine was likewise redder than natural, as is commonly the case in those who have died whilst digestion was going on.

The liver was tolerably supplied with blood; the gall bladder empty.

When strychnine is used endermically, as is not unfrequently done, the course of the phenomena is somewhat different. G. H. Richter, employed it in this way in many cases of hemiplegia, in one of which it occasioned symptoms of actual poisoning.

When the dose exceeded a quarter of a grain, a feeling arose in the part to which it was applied as if needles were run into the skin; this gradually spread over the whole limb; the temperature of the body was augmented; the pulse quickened, full and hard; the breathing constrained; pain was experienced in the same side of the head; the secretion of urine was increased, and a general perspiration broke out, which persisted for about an hour, after which the pricking of the surface, and the excitement of the vessels ceased. To these symptoms—and seldom later than two hours after the application of the agent—convulsive movements succeeded in the paralysed limbs like those induced by electricity, which augmented in violence and frequency with the increase of the dose, being strongest and most severe during the night, at which time the

limbs were moved involuntarily. When awake, a feeling of stiffness was experienced in all the limbs, which passed off when they were used. On digestion, defecation, and the appetite, the nitrate of strychnine seldom exerted any influence. Only in one case—in which no effects were induced on the nervous system, when the dose was gradually carried to three grains—was obstinate constipation produced. In general, when it was begun with in the dose of one-eighth of a grain, and on the next day one-fourth was given, on the third day one-half, and afterwards the dose was increased daily by the fourth of a grain, until one and a quarter was given,—the following unpleasant symptoms supervened. The patient experienced twitchings earlier than before, and first in the paralysed limbs. As these became, from minute to minute, more violent, a penetrating pain was felt in the occiput, with vertigo and tinnitus aurium. The twitchings now extended over the affected arm, and, subsequently, to the sound side, whereupon the vertigo and headach augmented, and insensibility, with difficult and stertorous breathing, ensued. The pulse now became very full, hard, slow, and intermitting; the countenance bluish red and turgid; the paralysed lower extremities of a marbled blue; the pupils very much dilated and the mouth open, the convulsions being occasionally so strong as to toss him to and fro on the bed. When these phenomena declared themselves, Richter removed the dressing, from the surface, which appeared inflamed, and still contained a quantity of strychnine, that had not been absorbed; the parts were then washed, and sprinkled immediately—according to Lembert's and Lesieur's recommendation—with two grains of the acetate of morphine; the face was washed with cold water, the soles of the feet brushed, and other excitants administered.¹

Morphine appears to be the most powerful antidote: under its use, the dangerous symptoms rapidly disappear, consciousness returns; the patient sleeps for some hours, and a general perspiration breaks out, after which he awakes with a feeling of dulness, and with stiffness of the limbs, which soon, however, vanish. In respect to the topical application of strychnine by the endermic method, A. L. Richter² remarks, that the preparations of strychnine produce much more powerful local effects than those of morphine; they

¹ See some experiments, relative to the action of strychnine on the nervous system, by Dr. H. Stannius, in Müller's Archiv. Heft. ii. 1837; and Brit. and For. Med. Review for Jan. 1838, p. 221.

² Die endermatische Methode, u. s. w. Berlin, 1835.

maintain the abraded portions of the skin in an inflamed state, promote suppuration more than the morphine, and occasion violent itching and burning, with a feeling as if needles were run into the skin.

Artus recommends, from his investigations, pure baryta (Aetzbaryt) as an antidote. It forms an insoluble precipitate with strychnine, and he esteems it to be more certain than the tinctures of iodine and bromine recommended by Donn  ,¹ the muriate of baryta, or the infusions of tar and galls recommended by Raspail.²

The effects, referred to above, were chiefly obtained from the administration of the nitrate of strychnine, but they may be esteemed applicable to all the preparations of strychnine, as we know nothing of any difference in their agency. It is probable, however, that the salts of strychnine, owing to their greater solubility, may have more action than the strychnine itself, although the muriatic and acetic acids, which are almost always present in the stomach, it might be presumed, would readily unite with it.

EFFECTS ON THE ECONOMY IN DISEASE.

The following remarks apply equally to the pure strychnine, and its salts, and to the alcoholic extract of nux vomica, to which the reader is referred, (see page 276.) It has been administered in

1. *Paralysis*, especially in that arising from the action of lead, in which Bally, Lembert, Bardsley, Andral, Rayer and Tanquerel,³ have employed it beneficially. In paraplegia and hemiplegia, it has been prescribed by Lesieur, G. H. Richter, Romberg, Bardsley, Bally, Lafaye, Oesterlen, Reinhardt, Heyfelder, Faye, Mart, Schaible, Raciborski, A. T. Thomson,⁴ Gellie,⁵ and numerous others.⁶

From the results of their observations it would seem, that strychnine is most efficacious in paraplegia; less so in hemiplegia, although it has often been given with advantage in the latter affection; but its administration in hemiplegia requires special circumspection particularly when the paralysis has succeeded to apoplexy.⁷

¹ Journal de Chimie M  d. v. 494, Paris, 1829.

² Nouveau Syst  me de Chimie organique. Paris, 1833.

³ Gazette M  dicale, pour 1835, p. 383.

⁴ Lond. Med. Gaz. April, 1831.

⁵ La Lancette Fran  aise, Ao  t 29, 1837.

⁶ P  trequin, Gazette M  dicale, Nov. 1838.

⁷ See Bally, Considerations sur la Strychnine, &c. in Bullet. G  n  ral de Th  rapeutique, F  v. 1838.

Romberg affirms, that, as a general rule, in cases of paralysis dependent upon disease of the central organs of the nervous system, he has never seen any striking effect from the endermic use of strychnine, and that great care is needed lest it should react injuriously on the brain. He considers it especially adapted for cases of paralysis, that are dependent upon some affection of the spinal marrow induced by mechanical concussion; as well as for the local paralysis that succeeds rheumatism, suppressed exanthems, &c. Mr. Pereira¹ has seen it very serviceable in that shaking or trembling action of the muscles, which is produced by habitual intoxication. G. H. Richter cured a case of aphonia by it, and it has been much used, and successfully, in amblyopia and amaurosis, by Short, Liston, Guthrie, Middlemore,² Henderson, Mart, Pétrequin³ and others. In these cases, it is generally used endermically on the temporal region. Dr. Stevenson,⁴ derived benefit from it—when applied in this way—in cases of amaurosis of many years' duration. Half a grain was repeated twice a day until tremors of the limbs were produced. He employed it in the same manner in other cases of local paralysis. In cases of amaurosis, Henderson advises, in addition, that a solution of strychnine should be dropped into the eye. It has likewise been given successfully in cases of paralysis of the bladder by Schaible, Bally, Hennemann, Behrend⁵ and others, and in paralysis of the facial nerve.⁶

In high grades of paraplegia, the internal use of the remedy is to be preferred, but in general the endermic administration is more advisable.

In paralysis of the limbs, a spot is selected in the vicinity of the spinal marrow.

Strychnine is likewise given in other affections. Very favorable reports have been made as to its efficacy in

2. *Neuralgia*. Mart found it beneficial in tic douloureux and in nervous headach, and Magnus in a case of neuralgia of the arm.

3. *Traumatic tetanus*. In this disease, it has been recommended by Lüders.

4. In *Hysteria*, *Hypochondriasis*, and *Dyspepsia*,⁷ it has been

¹ Medical Gazette, Vol. xix.

² Midland Medical and Surgical Reporter, May and August, 1831.

³ Bulletin Général de Thérap. Juillet, 1838.

⁴ Transactions of the Medical and Physical Society of Calcutta, Vol. v.

⁵ Medicin. Zeitung, Sep. 1837, S. 190.

⁶ Dr. O'Brien, Med. Chirurg. Review, and L'Expérience, Nov. 1838.

⁷ Dr. Melcombe, in Lond. Med. Gaz. for Mar. 4, 1837. p. 850.

advised by Schmidtman and Basedow, but morphine appears to render more essential service.

5. In *Chorea*, Romberg saw good effects from it. It has likewise been advised in *epilepsy*¹ and *cataplexy*. Fricke has administered it successfully in—

6. *Syphilitic Osteocopi*. It has also been given with benefit in cases of

7. *Dysentery* and *Diarrhœa*,² by Bardsley,³ Recamier, Geddings, and others; and it has been used endermically in cholera,—two or three grains being applied to a blistered surface on the nape of the neck. By MM. Dreyfus, Grimaud d'Angers and Potton it was given internally in the same affection to allay vomiting:—a quarter to half a grain being added to three ounces of water and prescribed in the dose of a spoonful every hour.⁴ Dr. Ryan,⁵ asserts, that he has repeatedly known a few of the pills—the formula for which is given below—check a profuse diarrhœa with rice coloured evacuations, and even when the extremities were blue in malignant cholera.

Lastly. From its efficacy in analogous affections of the digestive mucous membrane, Dr. Stokes⁶ thinks there is good reason to hope, that it may prove useful in *bronchitis*. It has been employed, indeed, in all the cases in which the alcoholic extract of nux vomica has been found of service, than which it is of course to be more relied upon, in consequence of its greater uniformity; the nux vomica itself being often found unequal. (See page 327.)

METHOD OF ADMINISTERING.

Pure strychnine is best exhibited internally, in the form of pill, or in spirituous solution; but if a little acid, especially the acetic, be added to it, it may be given in watery solution, as in this way a salt of strychnine may be formed extemporaneously. The dose is from one sixteenth to one eighth of a grain, which may be gradually increased until a grain is taken. In ordinary cases, it will be

¹ Brofferio, in Repertorio Medico-chir. di Torino, 1825, and Revue Médicale, iv. 488, Paris, 1825.

² Op. cit.

³ N. American Archives, No. 2, Nov. 1834.

⁴ Mérat & De Lens, Dict. de Mat. Méd. Art. Strychnine.

⁵ Formulary, 3d. Edit. p. 335, Lond. 1839.

⁶ Treatise on diseases of the Chest, p. 125, Dublin 1837, and Amer. Med. Library Edit., Philad. 1838.

sufficient to raise the dose to half a grain, two or three times a day, but if any circumstance should arise to cause its discontinuance, it ought not to be recommenced in doses as large as the last, but with small doses, as at the beginning. In the endermic application of the remedy, we sprinkle, twice a day, a quarter of a grain on the denuded surface, and slowly increase the quantity to half a grain, should this be necessary. If the larger doses do not act more beneficially, it will be advisable to discontinue the remedy for a few days—after which the smaller doses may again exert a signal influence—rather than to carry the dose still higher.

Pilulæ Strychninæ.

Pills of Strychnine.

℞. Strychnin. pur. gr. ij.
Conserv. rosar. ℥ss.

Divide in pilulas xxiv.

Dose.—One to two, morning and evening.

MAGENDIE.

℞. Strychninæ, gr. j.
Confect. ros. ℥ss.
Pulv. glycyrrhiz. ℥ss.

Divide in pilulas xij.

Dose.—One, night and morning. The quantity may be increased to four or five daily.

RYAN.

Tinctura Strychninæ.

℞. Strychnin. pur. gr. iij.
Alcohol, 36° (.837) ℥j. M.

Dose.—Six to twenty-four drops, twice or thrice a day.

MAGENDIE.

Mistura Strychninæ.

(*Potion Stimulante.*)

Mixture of Strychnine.

℞. Aq. destillat. ℥ij.
Strychnin. gr. i.
Sacch. alb. ℥ij.
Acid. acet. gtt. ij. M.

Dose.—A dessert-spoonful, morning and evening.

MAGENDIE.

Collyrium Strychninæ.

Collyrium of Strychnine.

- ℞. Strychnin. gr. ij—iv—vj—viij.
 Acid. acet. dil.
 Aq. destillat. aa. ℥j. M.

Two drops to be let fall into the eye, a few times a day, in amaurosis. HENDERSON.

STRYCHNINÆ ACETAS.

SYNONYMES.—Strychnium Aceticum, Acetate of Strychnine.

German.—Essigsures Strychnin.

In addition to the acetate, formed extemporaneously, as mentioned under strychnine, the proper acetate of strychnine has been administered, especially by Lüders and Fricke. It may be made, like the acetate of quinine, from the direct combination of the strychnine with acetic acid. According to Thénard, it is very soluble, and crystallises with difficulty. Even when diluted 40,000 times, its solution occasions a sense of bitterness on the tongue.

The following formulæ have been given by the physicians cited.

Guttæ Acetatis Strychninæ.

Drops of Acetate of Strychnine.

- ℞. Strychnin. acet. gr. iij.
 Alcohol. ℥j.
 Aq. cinnam. ℥vij. M.

Dose.—Five drops, twice a day, gradually increasing the dose.

LÜEDERS.*Tinctura Acetatis Strychninæ.*

Tincture of Acetate of Strychnine.

- ℞. Strychnin. acet. gr. iss.
 Alcohol, ℥ss. M.

Dose.—From three or four, to twenty or thirty drops, to be taken at bed-time, in cases of syphilitic pains of the bones. FRICKE.

STRYCHNINÆ IODAS.

SYNONYMES.—Strychnina Iodata, Strychnium Iodicum, Iodate of Strychnine.

German.—Iodsaures Strychnin.

METHOD OF PREPARING.

The preparation of this salt, according to Magendie, is easy. It is sufficient to add a concentrated solution of iodic acid to powdered strychnine; in a moment the mass swells up, absorbs water, becomes thicker and at times very consistent. It is now treated with boiling alcohol, filtered, and left to spontaneous evaporation. In this way, beautiful crystals of iodate of strychnine are obtained. The iodic acid, proper for this preparation, is obtained, according to Geiger, in the following manner. Nine parts of the iodate of baryta are boiled with two parts of oil of vitriol, previously diluted with ten times as much water, for half an hour. It is then filtered, and evaporated by a gentle heat to the consistence of a thin syrup, and is exposed to the air for spontaneous evaporation.

The iodate of strychnine may likewise be formed by double decomposition, by mixing a soluble iodate, as iodate of soda, with a solution of sulphate or muriate of strychnine. The iodate of strychnine is precipitated, which may be treated with boiling alcohol, and crystallised as above directed.

The iodate is of a white colour, and crystallises in beautiful prismatic needles: it is but slightly soluble in cold water, but more so in boiling water and alcohol.

EFFECTS ON THE ECONOMY.

"This salt," says Magendie, "is one of the most active poisons with which I am acquainted. A single grain is sufficient to destroy a strong dog under tetanic symptoms. It acts, likewise, powerfully on the diseased organism. I gave it to several persons with a success which far exceeded my expectations. It proved effectual in some old paraplegic affections, which had been esteemed incurable, and after all the usual remedies had been administered in vain."

He gave it in pills, each of which contained one eighth of a grain. One of these was prescribed night and morning, and the dose was gradually increased, until ultimately a grain was taken

in the twenty-four hours. The greatest circumspection was, however, necessary in its use.

Magendie is of opinion, that the *hydriodate of strychnine* might be advantageously introduced into medicine. It is prepared by mixing a solution of iodide of potassium with a concentrated solution of acetate of strychnine: a white crystalline powder is precipitated, which is soluble in alcohol, and is the pure hydriodate of strychnine.

It does not appear to have been as yet used in medicine.

STRYCHNINÆ NITRAS.

SYNONYMES.—Strychnium Nitricum, Nitrate of Strychnine.

German.—Salpetersaures Strychnin.

This preparation of strychnine has been more used in Germany than any other. It has been received into the Prussian Pharmacopœia, (Landespharmakopœe,) where it is directed to be prepared in the following manner:

METHOD OF PREPARING.

On eight pounds of *nux vomica* sixteen pounds of spirit of wine (Kornbranntwein) are poured, and the liquid is distilled to one half. The *nux vomica* is then freed from the liquor by filtering, is dried and reduced to coarse powder. This is digested two or three times with a sufficient quantity of the spirit, and after digestion it is strained. The tinctures are then subjected to distillation, and what remains is evaporated along with the fluid that remained after the boiling; to this, acetate of lead, dissolved in a sufficient quantity of distilled water, is added so long as a precipitate falls. The fluid, separated as much as possible from the precipitate, by means of the filter, is now evaporated to one half, by a gentle heat. When cold, it is mixed with two ounces of calcined magnesia, and is suffered to stand for three days, when the deposit is separated by the aid of the filter, and is washed, and dried. This, after having been rubbed to powder, is digested two or three times in alcohol, and the tinctures are subjected to distillation, until only a few ounces remain. The strychnine, which, on cooling, appears in the retort in the form of a white powder, is separated by the filter, washed

two or three times with rectified spirit of wine diluted with an equal quantity of common water, and is neutralised by a proper quantity of dilute nitric acid. The filtered fluid is evaporated by a gentle heat so as to allow the formation of crystals. These crystals are needle-shaped, colourless, of a silky splendour, and a very bitter taste; they are soluble with difficulty in alcohol, but dissolve in ether.

METHOD OF ADMINISTERING.

The dose and mode of administering the nitrate of strychnine are the same as in the case of the pure strychnine. Its endermic application will sometimes succeed when the internal administration has been more limited in its results. The experiments instituted by Dr. Stannius, and others, and referred to in a former page (420,) were with the nitrate of strychnine.

Magendie found, in his experiments, that this salt completely prevented the coagulation of the blood.¹

STRYCHNINÆ SULPHAS.

SYNONYMES.—Strychnium Sulphuricum, Sulphate of Strychnine.

German.—Schwefelsaures Strychnin.

The same effects have been observed from this preparation as from the others. It is also dispensed in the same forms and doses. It may be obtained by the simple union of strychnine with sulphuric acid. According to Pelletier, 100 parts of the alkaloid saturate 10.486 of the acid. It is soluble in less than sixteen parts of cold water, and crystallises, when neutral, in transparent cubes; when acid, in needles. Its taste is extraordinarily bitter. It is decomposed by every soluble salifiable base.

¹ Leçons sur le Sang; and translation in Lond. Lancet, Jan. 26, 1839, p. 637.

SULPHURIS CARBURETUM.

SYNONYMES.—Sulphuretum Carbonii, Carboneum Sulphuratum, Alcohol Sulphuris, Bisulphuretum Carbonii, Sulphuret of Carbon, Carburet of Sulphur.
French.—Sulfure de Carbon, Carbure de Soufre, Soufre Carburé, Alcool de Soufre.
German.—Schwefelalcohol, Schwefelkohlenstoff, flüssiger Kohlenschwefel, Kohlensulfurid.

The carburet of sulphur or sulphuret of carbon was discovered by Lampadius in the year 1796. It is a transparent and colourless fluid at the ordinary temperature, has a very penetrating and disagreeable odour; and a taste, cooling at first, but afterwards burning, acrid, and somewhat aromatic. Its specific gravity is 1.263. It boils at 134° of Fahrenheit. It is not decomposed at the highest temperatures; but volatilises rapidly in the air, and burns readily. It is not soluble in water, but is so in alcohol, ether, and in the fixed and volatile oils. Water separates it immediately from those solutions. It unites intimately with the alkalies; but, of the acids, the aqua regia—which is a mixture of the nitric and muriatic acids—alone lays hold of it. It dissolves potassa, camphor, sulphur, and phosphorus. Lampadius, in the first instance, regarded the sulphuret of carbon as a compound of sulphur and hydrogen; it is now, however, decided, that it consists of sulphur and carbon,—according to Vauquelin, in the proportion of 85 or 86 to 15 or 14; according to Berzelius, and Marcet, of 84.84 to 15.16.

MODE OF PREPARING.

The following method is recommended by Mitscherlich:¹

The temperature, at which sulphur enters into ebullition is not sufficient to make the two substances combine, but if burning coals be placed in contact with vapours of sulphur, the combination takes place immediately. With this view, a tube of porcelain may be used, or, what is better, one of cast iron, lined internally with a coat of clay by running it several times through a paste of clay and water, and heating the tube each time. In this manner, the crust of dry clay will become strong enough to prevent the sulphur from attacking the iron.

The tube is then filled with strongly calcined coals, and is heated to redness in an oblong furnace. One end of the tube is closed by

¹ *Elémens de Chimie*, traduits par M. B. Valerius, i. 156, Bruxelles, 1835.

a cork, and a small hole is made at the upper part of the tube, through which the sulphur is introduced, and which is closed by a plug. The other end, which has passed through the furnace, is likewise closed by a large cork, traversed by a glass tube. To make the stoppers close the tube hermetically, they are boiled with glue. The long glass tube passes into a large jar, through a hole in which it is adapted hermetically by means of a cork. The ordinary aperture of the jar is closed by a cork in which a tube is fitted hermetically, which passes through the window. At the bottom of the jar is contained a little water. The long tube, passing from the furnace to the jar, may be kept cool by water made to drop upon it, or by covering it with snow or ice.

When the charcoal is heated to redness, small fragments of sulphur are dropped in, from time to time, by means of the aperture before mentioned, which must be carefully closed each time afterwards. The sulphur, in melting, runs towards the hottest parts of the tube, to which a slight inclination has been given in placing it in the furnace. It enters into ebullition, and is transformed into sulphureous vapour, which, by passing over the hot coals, combines with them: the sulphuret of carbon, or carburet of sulphur formed, condenses in the long tube, from which it runs into the jar, and falls to the bottom of the water. As the coal always retains a little hydrogen, the sulphur likewise unites with it, to form a gaseous body, which is carried off by the tube passing through the window.

The carburet of sulphur is preserved in well-stopped bottles, and is covered with about an inch of water, whence it can be best obtained for use by means of a small glass or ivory syringe.

EFFECTS ON THE ECONOMY.

The carburet of sulphur holds a place amongst the transient or diffusible stimulants.¹ Its most marked effects are said to consist in its "exciting the function of cutaneous transpiration to copious sweating; increasing the secretion of urine, elevating the temperature of the body, quickening the pulse, and causing congestions towards the head and those parts of the body whose vitality may have been already somewhat augmented."² Its most striking agency is exhibited in the more active exercise of the functions of

¹ Wutzer, *Journal de Chimie Méd.*; and *Amer. Journ. Med. Sciences* Nov. 1831, p. 215.

² Riecke, *Die neuern Arzneimittel*, S. 109.

the skin. According to Mansfeld, it acts likewise as an emmenagogue; but, in this respect, probably only like similar excitants.

On account of its great volatility, it produces on the skin the feeling of considerable cold.

The discoverer of the carburet of sulphur first recommended it as a remedial agent.¹ He particularly advised it, both internally and externally, in rheumatic and gouty affections. In Freiberg, a mixture of one part of camphor, two of carburet of sulphur, and four of spirit of wine, is a very common external application in rheumatic pains. Kappe found decided advantage from it in gout and rheumatism, and Mansfeld and Wutzer, resting upon a series of observations, maintain, that in rheumatism unaccompanied by fever, or where the fever is slight, it exceeds every other remedy of the class. Dr. Otto,² of Copenhagen, prescribes four drops of a mixture composed of one part of the carburet of sulphur, and four parts of highly rectified spirit of wine, to be taken every two hours: and he directs the affected parts to be rubbed with an embrocation, composed of one part of the sulphuret of carbon, and four parts of olive oil. The cure, he states, was ordinarily effected in from eight to fifteen days. In deep-rooted dyscrasies, however, these gentlemen found no advantage from it. On the other hand, in trials at the Berlin Charity, it was found to be of no avail in chronic rheumatism, although it was used for a long time, and given in by no means small doses.

Mansfeld, also, employed it in cases of after-pains, rubbed, without admixture, on the abdomen; and he affirms, that good effects resulted from it, even when the *secale cornutum* had failed.

In hysteric fainting, the same gentleman found it very useful when internally exhibited. Lampadius, likewise, recommended it in fainting, as well as in asphyxia. Krimer found it extremely efficacious in asphyxia from carbonic acid, but he frequently thought it necessary to premise blood-letting. In this way, he treated eleven cases; and only one case—in which apoplexy had already supervened—terminated fatally. The same physician exhibited it in some cases of drunkenness, attended with loss of consciousness, and found its effects very beneficial. He gave it with great advantage once in a case of *goître*; and, in incarcerated hernia, no agent, he says, facilitates so much the taxis as the cold

¹ Lampadius, in *Bulletin des Sciences Médicales de Ferussac*, xi. 315.

² *Annales de Chemie Médicale*, and *Amer. Journal of the Med. Sciences*, for Nov. 1836, p. 222.

produced by dropping the carburet of sulphur on the tumour. Lampadius found, that slight burns were instantaneously cured by it. Clarus recommends it in hypertrophy of the coats of the stomach, and in contraction of the œsophagus—administered according to the formula given below. Every thing, indeed, says Riecke, encourages the further trial of the sulphuret as a remedial agent.¹

MODE OF ADMINISTERING.

Internally, the carburet of sulphur may be given in doses of from one drop to four, every five or ten minutes, in cases of fainting and asphyxia; but where such a rapid analeptic agency is not demanded, it may be given every two or three hours. It may be administered dropped on sugar, or in a spoonful of sugared water or barley water. Clarus thinks it is best given in cow's milk.

Externally, it is either applied pure, when a rapid development of cold is needed—as in cases of burns and incarcerated hernia—or dissolved in alcohol or oil.

Guttæ Sulphuris Carbureti.

Drops of Carburet of Sulphur.

- ℞. Sulphur. carbur. ʒij.
Æther. sulphur. ʒj. M.

Dose.—A few drops on sugar.

LAMPADIUS.

- ℞. Sulphur. carbur. ʒj.
Sp. vini rectific. ʒss. M.

Dose.—Four to six drops, every two hours, in cases of rheumatism.

WUTZER.

- ℞. Sulphur. carbur. ʒj.
Sp. vin. rectific. ʒij. M.

Dose.—Five, ten, or fifteen drops, three times a day, in cases of rheumatism.

WUTZER.

Mistura Sulphuris Carbureti.

Mixture of Carburet of Sulphur.

- ℞. Sulphur. carbur. ʒj.
Lact. vaccin. ʒvj.
Sacch. alb. ʒij. M.

Dose.—A table-spoonful, four times a day, or oftener. CLARUS.

¹ Die neuern Arzneimittel, u. s. w. S. 110.

Embrocatio Sulphuris Carbureti.

Embrocation of Carburet of Sulphur.

- ℞. Sulphur. carbur. ℥ss.
Olei amygd. dulc. ℥j. M.

To be rubbed in, in cases of old gouty nodes.

MANSFELD, AND OTTO.¹

- ℞. Sulphur. carbur. ℥ij.
Ol. oliv.
seu Linim. ammon. camphor. ℥ij. M.

To be rubbed in, in cases of rheumatism.

WUTZER.

- ℞. Camphor. ℥ij.
Solve in
Sulphur. carbur. ℥ss.
Adde
Sp. vini rectific. ℥j. M.

To be used in friction, in cases of rheumatism, and especially in
rheumatic odontalgia.

SULPHURIS IODIDUM.

SYNONYMES.—Sulphuris Ioduretum, Sulphuris Iodatum, Ioduret, or Iodide of Sulphur.

French.—Soufre Ioduré, Iodure de Soufre.

German.—Iodschwefel.

MODE OF PREPARING.

The iodide of sulphur, first described by Gay Lussac, and to which brief allusion has already been made, (p. 305,) crystallises in needles, eagerly attracts water, and is thereby readily decomposed.

EFFECTS ON THE ECONOMY.

Bielt has exhibited this agent in squamous, pustular, and papular diseases of the skin. It has been found especially effective in

¹ Bibliothek for Læger, 1835, and Brit. and For. Med. Review, July, 1836, p. 252.

psoriasis, in the form of frictions. Patients, who had been long affected with diseases of this kind, which had resisted every other remedy, were cured in four or five months by the iodide of sulphur alone. To prevent relapses, Biett advises that the frictions should be continued after the eruptions have scaled off. He found it equally efficacious in the *lepra vulgaris* of Willan; and in *acne*—the *gutta rosacea* of Alibert—when the inflammation of the skin had passed away. Even the *acne indurata* was often completely cured by it. He found it also beneficial in inveterate *porrigo* of the scalp.¹ At times, after the rubbing, a diffuse red inflammation of the skin arises, with subsequent desquamation; and, in particular cases, the inflammation extends even to the subjacent cellular membrane. In old standing *lepra*, Rayer² prefers it for external use to calomel and white precipitate, and he ranks it highly with the iodides of mercury, for the cure of *lupus non exedens*; and by Dr. Volmar³ it has been used, with great success, in *herpes pustulosus labialis*.

The iodide of sulphur is likewise extolled by Lugol as a very active therapeutical agent. Cless affirms, that in chronic squamous affections of the skin, especially in psoriasis, he has employed it with advantage, but he was not able to cure *lepra vulgaris* with it. The inhalation of the vapour of this substance has been employed in humoral asthma, by Dr. Copland,⁴ with temporary advantage.

For its farther uses, see page 305.

MODE OF ADMINISTERING.

Magendie gives formulæ for the ointments used by Biett. One contains five parts of iodide of sulphur to ninety-six parts of lard; another eight parts of the iodide to one hundred and forty-four parts of lard. In *porrigo* of the scalp, Biett advises an ointment of from one to five scruples of the iodide to eleven pounds of lard, of which a dram is used at each time of rubbing.

¹ Cazenave et Schedel, *Maladies de la Peau*, p. 219; and Cogswell on Iodine, p. 120, Edinb. 1837. See, also, page 305 of this volume.

² *Diseases of the Skin*, p. 634.

³ *Die neuesten Entdeckung. in d. Mat. Med.*; cited by Pereira, *Elements of Materia Medica*, Pt. i. p. 270. Lond. 1839.

⁴ *Dict. of Practical Medicine*, Art. Asthma.

TANNICUM PURUM.

SYNONYMES—Tanninum, Principium Adstringens, P. Scytodephicum, Tannin.

German.—Tannin, Gerbestoff, Gerbsäure.

This article, in its pure state, has been subjected to experiment very recently only.

METHOD OF PREPARING.

According to Buchner,¹ Tannin should be prepared for medical use in the following manner.

From eight to twelve parts of hot water must be poured on one part of powdered galls, and the mixture be allowed to digest for an hour, frequently agitating it. The infusion must then be filtered, and the residue be again treated in the same manner with a little hot water. The different infusions, which generally pass through the filter turbid, must be mixed together, and a little dilute sulphuric acid be added by drops, constantly shaking the mixture, so long as any precipitate of tannin follows. The tannin is deposited, in this way, very soon in a collected yellowish white, gelatiniform mass, which by the influence of air gradually assumes a brown colour.

After the fluid is poured off, the residue is washed twice with cold water acidulated with sulphuric acid; carbonate of baryta, or carbonate of potassa, is then added to it in small portions, carefully shaking the mixture, until there is no farther effervescence, and until a portion of the mass dissolved in water and tested by muriate of baryta affords no more evidence of the presence of sulphuric acid. The yet moist mass is then put into a retort with alcohol of about ninety per cent., which is added repeatedly in small portions; the alcohol is made to boil, to dissolve the tannin and separate it from the sulphate of baryta or sulphate of lime; the alcoholic solution is then poured off clear, and by a gentle heat evaporated to dryness.

Tannin, prepared in this manner, is friable, resinoid, almost as shining as glass, of a pale yellow colour, translucent, reducible, by rubbing, to a white powder, of an astringent taste, soluble in water,

¹ Repertorium, B. xxxiv, H. 3, also, A. W. Buchner, Neueste Entdeckung. über die Gerbsäure, u. s. w. Frankf. 1833, and Dierbach, in Heidelberger klinische Annalen, B. x. H. 3, S. 339, Heidelb. 1834.

alcohol and ether, reddening litmus paper, and forming salts with a base, like an acid.

EFFECTS ON THE ECONOMY.

Tannin is a strong astringent,¹ which has hitherto been mainly used in uterine hemorrhage, and especially by the Italian physicians. Porta² was, perhaps, the first who tried it. He found it very efficacious in cases of uterine hemorrhage not dependent upon any organic mischief in the uterus. It exhibits its powers, according to him, even in small doses—as of two grains, and is well borne by the stomach. Ferrario,³ likewise administered it with advantage in the same affection, but he does not consider it adapted for cases in which either partial or general plethora, or local excitement of the uterus, or any organic disease, exists: it is indicated only where pure atony is present. He gives it in the form of powder or pill, in two grain doses, six times a day. The effect, according to him, is generally good: the hemorrhage diminishes and soon ceases, and, at the same time, the strength augments, and recovery succeeds, without any disturbance of the functions. Giadorow⁴ details two cases of diabetes cured by it, when given in combination with opium, as in the prescription at the end of the article. The first patient was cured in ten; the second in twelve days.

According to Ricci,⁵ tannin has frequently been employed in Italy both in internal and external hemorrhages. On the other hand, G. A. Richter⁶ affirms, that he has given it in habitual metrorrhagia without any advantage whatever. Within the last year or two, M. Cavarra⁷ has instituted many experiments on animals, as well as on himself, from which he concludes, that when tannin is placed in contact with certain parts of the living economy, it exerts upon them the same chemico-vital action, which it does on an inert organic tissue, or, in other words, it tans them as it tans leather.

¹ See, on the action of this agent, Mitscherlich, *Medicinische Zeitung*, No. 43, 1838. and *Bullet. Général de Thérap.* Mars 30, 1837.

² Delpech, *Mémorial des Hôpitaux du Midi*. &c. Février, 1829, p. 51.

³ *Annali universali di Medicina*, Gennaio, 1829.

⁴ *Annali universali di Medicina*, and *Gazette Médicale*, Sep. 15, 1832.

⁵ *Bulletin des Sciences Médicales*, Sept. 1828.

⁶ *Arzneimittellehre*, Supplement, p. 60, also Cavalier, in *Archiv. Générales* xix. 589.

⁷ *Bulletin de l'Académie Royale de Médecine*, Janvier, 1837; also, *Dunglison's Medical Intelligencer*, Oct. 16, 1837, p. 258, and *Bulletin Général de Thérapeutique*, Mars 30, 1837.

"These parts," he says, "are the mucous membranes of the urethra, vagina, intestines and lungs. The action of the tannin appears to be, to cause such a condensation or contraction in them, that the glands with which they are studded no longer afford passage for the mucus which they secrete."

M. Cavarra, asserts, that he has proved these positions by numerous experiments and demonstrations. When tannin is taken internally, its immediate effect is constipation, by arresting the secretion from the mucous membrane. When it has reached the stomach, it is absorbed, and carried into the current of the circulation. There exists between this organ and the vagina, the urethra, and the lungs no communication except through the circulatory system, and, consequently, the tannin—it is fair to presume—must be absorbed to cure leucorrhœa, gonorrhœa, and the most obstinate chronic catarrhs. M. Cavarra concludes, that of all the effects of tannin, two of the most surprising are, the cures operated by it in cases of the most obstinate nervous coughs, and the excellent action it exerts in phthisis. Farther experiments are, however, demanded before this last point can be admitted. From our knowledge of the properties of tannin, it is not easy to see how it, or any other astringent, can be of much service in the latter malady.

According to Hüter, tannin prepared from dried galls, in the form of ointment or diluted with distilled water, is very serviceable in most cases of Egyptian ophthalmia. In the hyperemesis, induced by ipecacuanha or emetine, it may be administered as an antidote.

According to the experiments of Magendie,¹ tannic acid is one of the substances that oppose the coagulation of the blood.

METHOD OF ADMINISTERING.

It may be given in the form of pill, or draught, or as a lavement, and in the dose of from a quarter of a grain to two grains, without producing any unpleasant constipation, but its effects must be observed with care.²

Injectio Tannici.

Injection of Tannin.

℞. Vin. rubr. ℥vj.
Tannic. gr. xx. M.

¹ London Lancet, Jan. 26, 1839, p. 636.

² Cavarra, in Bulletin Général de Thérapeutique, Mars 30, 1837.

Given in chronic blennorrhœa or what is called an old gleet.¹

RICORD.

Pomatum Tannici.

Pomatum of Tannin.

(*Liparolé de Tannin.*)

℞. Adipis suill. ℥xij.

Tannic. ℥ij.

Aquæ pur. ℥ij.

Dissolve the tannin in the water, by tritulating them in a glass mortar; add the fat and mix.²

BERAL.

Lotio Tannici.

Lotion of Tannin.

(*Hydrolotif de Tannin, pour l'urèthre.*)

℞. Aquæ destillat. ℥viiij.

Tannic. gr. xxxij. Solve.

Employed in obstinate blennorrhœa.

BERAL.

Pilulæ Tannici.

Pills of Tannin.

℞. Tannic. in pulv. gr. vj.

Gum acac. in pulv. gr. xij.

Sacchar. pulv. gr. lxxij.

Syrup. q. s. ut fiat massa in pilulas pond. gr. iv. sing.

Dose.—One to four, morning and evening, where an astringent is needed.

CAVARRA.

Pulveres Tannici et Opii.

Powders of Tannin and Opium.

℞. Tannic. ℥ij.

Pulv. opii. gr. ʒ. Misce et divide in pulveres tres.

Dose.—One, morning, noon and night; gradually increasing the quantity of tannin to four scruples daily.

GIADOROW.

¹ La Lancette Française, No. 33, Paris, 1838.

² Bulletin Général de Thérapeutique, Janvier, 1838.

THUYA OCCIDENTALIS (FOLIA.)

SYNONYMES.—Thuya, American Arbor vitæ.

French.—Thuya du Canada, Cèdre blanc.

German.—Blätter des gemeinen Lebensbaumes.

The leaves of the thuya—of the natural family coniferæ;—sexual system, monœcia monadelphia, have been long used as an article of the *Materia Medica*¹, but they had of late fallen into oblivion until the Homœopathists restored them to notice.

Hahnemann advises that condylomata should be touched with the expressed juice, and Jahn in his homœopathic experiments found it was not unworthy the attention of experimenters. In two cases in which several celebrated agents had been fruitlessly employed, he applied the juice of the thuya with apparent advantage: he does not, however, consider those cases to be decisive, as the patient had taken mercury for a long time, and perhaps the effects began only to be evident, whilst the thuya was administered.

Fricke likewise made trial of it, as well as of the *tinctura thuyæ*, which he formed of five parts of spirit of wine, and one part of the juice; but his trials were not favourable. Even in a dilute form, the tincture acted so powerfully as an excitant, on the parts surrounding the condylomata, that it could not be continued, but after three, four or six weeks' use, was put aside, and other approved remedies substituted for it. Generally, in the course of a few days, the parts of the skin, surrounding the condylomata, became sore and very painful, and the condylomata either remained as before, or began to increase in size; in a few cases only did they disappear under the use of the dilute tincture, and then more slowly than Fricke had noticed from other agents.

The testimony of Dr. Köhler, of Warsaw, is, however, entirely opposite. For five years, he says, the tincture of thuya was employed by many physicians of that city, both in hospital and private practice, and with the most decided success. Riecke,² too, affirms, that in the year 1831 he had treated a great number of patients with it, always with the best effect; and without the occurrence of a relapse, or the least sign of inflammation, excoriation or other inconveniences supervening. It was commonly but necessary to

¹ Wood and Bache's Dispensatory, 4th edit. Philad. 1839.

² Die neuern Arzneimittel, S. 394.

apply the remedy for a fortnight or three weeks, in order that the removal of every condylomatous growth should be effected. In the generality of cases, the internal use of mercury was conjoined, but even where the external employment of the thuya was alone had recourse to, the result was entirely satisfactory. Riecke not only touched the condylomata with the tincture, but kept constantly applied to them lint dipped in it, and without the supervention of any unpleasant consequences.

It would seem to be probable, from these discordant results, that there must have been some difference in the preparation. The following form was used by Riecke :

R. Folior thuyæ occident. $\mathfrak{z}$ i.

Contunde et tere in mortario vitreo affundendo sensim sensimque spiritus vini $\mathfrak{lbss}$. Massam immitte in cucurbitam vitream ; digere per aliquot dies, dein cola et serva.¹

Riecke remarks, that he never found it necessary to dilute this tincture.

UREA.

SYNONYMES.—Uricum, Nephrine.

French.—Urée, Extrait savonneux de l'urine.

German.—Harnstoff.

This immediate principle of the urine of men and quadrupeds was discovered in an impure state by Rouelle, in 1773 ; and since then it has been studied by Cruikshanks, Fourcroy and Vauquelin, Berzelius and Proust more especially,—by the last of whom it was obtained pure.²

METHOD OF PREPARING.

Urea is obtained by placing a mixture of equal volumes of urine, reduced to the consistence of syrup, and nitric acid at 20° in a

¹ " Take of the leaves of the thuya occidentalis, an ounce ; bruise and rub in a glass mortar, gradually adding of spirit of wine, half a pint ; put the mass into a glass cucurbit ; digest for some days ; then filter and keep for use."

² *Annales de Chimie et de Physique*, x. 369, and Mérat & De Lens, Art. Urée.

refrigerative bath ; by which means the crystallised nitrate of urea is precipitated. On decomposing this—washed in the cold and dissolved in water—by carbonate of potassa, reducing it almost to dryness, and treating the residue by alcohol at 40° , which takes up the urea, crystals may be obtained by evaporation, which may subsequently be procured colourless by the agency of animal charcoal.

M. Henry,¹ who was not satisfied with the scanty product yielded by this process, recommends the following :—Add to fresh urine a slight excess of subacetate of lead ; a precipitate is thus formed, which consists of oxide of lead united to the various acids of the urine, together with the mucus, and a great part of the animal matter ; the decanted liquid is then treated with sulphuric acid in slight excess to separate the lead, and afterwards, in the progress of the evaporation, to decompose the acids of soda and lime, that may have been formed. After having separated the white precipitate, concentrate rapidly over a steady fire, adding a portion of animal charcoal during the ebullition. When the whole has become a clear syrup, pass it through linen of close texture, and then reduce it one third by evaporation. On cooling, the liquid is converted into a yellow mass, crystallised in needles, formed of a great proportion of urea and some salts. The crystals being drained and pressed are added to those obtained from the mother waters treated in a similar manner. They are next treated with a very small quantity of carbonate of soda, with the view of separating any remaining acetate of lime, and then digested in alcohol of 38° to 40° . The alcoholic solution being filtered, and the alcohol separated by distillation, the urea remains, which may be crystallised afresh from water, if necessary.²

Urea, as thus obtained, is in silky or prismatic needles, very soluble, and of a cooling taste.

EFFECTS ON THE ECONOMY.

The experiments of M. Ségalas have established, that urea is devoid of any noxious action on animals into whose veins it has been injected, and, consequently, that we cannot ascribe the serious symptoms to it, which arise from the absorption of urine in certain morbid cases. They demonstrate farther, what has been confirmed

¹ Journal de Pharmacie, xi. 161, Paris, 1829.

² Manual of Materia Medica and Pharmacy ; by MM. H. M. Edwards and P. Vavasour, p. 231, Philad. 1829.

by the trials of Fouquier, that urea is a diuretic, and, therefore, might be useful in dropsy: the latter gentleman employed it, also, but unsuccessfully in diabetes.¹ According to the author's friend, M. Fée,² urea is received into the lists of the *materia medica* in the *Batavian Pharmacopœia*, and in some others less known.

MODE OF ADMINISTERING.

Urea has been given in solution in distilled water, sweetened, in the dose of twenty-four to thirty grains, and even as high as several drams in the day.

VERATRINA.

SYNONYMES.—*Veratria*, *Veratrinum*, *Veratrine*.

French.—*Vératrine*.

German.—*Veratrine*, *Sabadillin*.

This alkaloid, which was discovered in 1819, by MM. Pelletier and Caventou,³ and almost at the same time by Meissner,⁴ is commonly prepared from the seeds of the *veratrum sabadilla*. It is contained in several of the plants belonging to the family *Colchicaceæ*.

METHOD OF PREPARING.

The seeds of the *veratrum sabadilla* are repeatedly treated with boiling alcohol. These tinctures, filtered when almost boiling, allow whitish flakes of wax to be deposited on cooling; the dissolved matters, brought to the consistence of an extract, are now dissolved in cold water, and filtered, whereby a small quantity of fatty matter remains on the filter. The solution is then slowly evaporated, when a yellowish orange-coloured precipitate is formed, which possesses the characters of the colouring matter found in

¹ *Journal de Physiol. de Magendie*, ii. 344, & *Formulaire pour la Préparation*, &c. de plusieurs nouveaux Médicaments.

² *Cours d'Hist. Naturelle Pharm.* ii. 764: cited in Mérat & De Lens, *Dict. de Mat. Méd. Art., Urée*.

³ *Annales de Chimie et de Physique*, xiv. 69.

⁴ *Gilbert's Annalen der Physik*, lxx. 335.

almost all woody vegetables. On adding a solution of acetate of lead to the still deeply coloured liquid, a new and very abundant yellow precipitate is thrown down, which can be separated by means of the filter. The liquor, now nearly colourless, contains, besides other substances, acetate of lead, which had been added in excess; this is separated by means of a stream of sulphuretted hydrogen: the liquor is then filtered, and concentrated by evaporation; treated by magnesia, and again filtered. The magnesian precipitate is digested in boiling alcohol, and on evaporating the alcoholic liquors, a pulverulent, extremely acrid matter is obtained, which possesses all the properties of the alkalies. It appears at first yellowish; but, by solutions in alcohol, and subsequent precipitations, caused by pouring water into the alcoholic solutions, it is obtained in the form of a very white and perfectly inodorous powder.¹

Veratrine is scarcely at all soluble in cold water; but boiling water dissolves one-thousandth part of its weight, and becomes sensibly acrid. It is very soluble in ether, and still more so in alcohol. It is not soluble in alkalies, but is so in all the vegetable acids: with these it forms uncrystallisable salts, which, on evaporation, present the appearance of gum. The sulphate alone affords rudiments of crystals, when its acid is in excess. Nitric acid combines with it; but, if added in excess, it does not colour it red, as in the case of morphine, brucine, and impure strychnine, but very rapidly resolves the vegetable substance into its elements, and gives rise to a yellow detonating matter.

Veratrine has an alkaline reaction. When exposed to heat, it liquefies at a temperature of 122° Fahrenheit, and has then a waxy appearance. On cooling, it forms a translucent mass, having the appearance of amber. When distilled on the naked fire, it swells up, is decomposed, and forms water, much oil, and leaves behind a bulky coal. The taste of veratrine is very acrid, but without bitterness.

Of late, new light has been thrown on veratrine by the investigations of Couerbe. According to him, when prepared in the mode above mentioned, it still contains several other substances, *sabadillin*, *veratrin*, gum resin of the *sabadilla*, and a black,

¹ Magendie's *Formulaire pour la Préparation, &c. de plusieurs nouveaux Médicamens*. Veratrine has been received into the London Pharmacopœia. See Brande's *Dict. of Mat. Med.* p. 468. London, 1839.

For M. Righini's method of obtaining what M. Soubeiran calls "medical veratrine," see *Journal de Pharmacie*, Oct. 1837.

greasy substance, which unites the other matters, and conceals their properties. The following is the form given by Couerbe for obtaining veratrine in its greatest purity:—

Sabadilla seeds are treated with boiling alcohol at 36° (.847) and after they have been exhausted in this manner, the liquor is distilled to obtain the extract, which contains a greenish fatty matter in great quantity. This extract is treated with dilute sulphuric acid, and the solution is suffered to boil a few minutes, when it is filtered. In this manner, the veratrine, sabadillin, the gum resin, and the brown colouring matter are dissolved; and, by precipitation with potassa, all these matters are obtained. It is sufficient to treat the precipitate again with alcohol, and distil it, in order to obtain the impure veratrine, which is subjected to purification, by being dissolved afresh in dilute sulphuric acid, precipitated by an alkali, and dried. In this manner, a delicate white powder is obtained, of very acrid taste, with an alkaline reaction, uniting with acids without forming crystals,—in short, the veratrine of authors in its greatest purity.

In order to separate the substances newly discovered by Couerbe the veratrine must be dissolved in water acidulated by sulphuric acid, and to the solution nitric acid is added by drops, so long as there is a precipitation of very tenacious matter—the black greasy substance above mentioned. The fluid is then decanted; precipitated by potassa or ammonia, and the precipitate washed with cold water. It is then treated with alcohol, to separate any inorganic salts which it may contain; the alcohol is next evaporated, when a matter—in appearance resinoid—is obtained, which contains all the above-mentioned constituents of the common or impure veratrine, with the exception of the dark greasy matter which was separated by the nitric acid.

By means of boiling water, two of the constituents are separated—the sabadillin and the gum resin: the first crystallises from the liquid on cooling, and the second is procured by suffering the mother waters of the sabadillin to evaporate *in vacuo*, or by a gentle heat, to dryness. The water has left two other matters undissolved, the pure veratrine and the veratrin. By treatment with ether, which dissolves the former, they may be separated: the veratrin remains undissolved.

Pure veratrine does not crystallise, but unites with acids, forming combinations that readily crystallise. It is white, solid, and friable, and fuses at 212° Fahrenheit. It is not soluble in water, but is readily so in ether and alcohol. The sulphate forms long,

loose needles, fuses on the application of heat, and loses thereby two atoms of water. It contains 100 parts of veratrine, and 14.66 of water.

The muriate of veratrine is very soluble in water and alcohol, but is easily decomposed by heat. According to Couerbe, pure veratrine agrees in its properties with the impure, and is the active principle of the latter.

Sabadillin, obtained in the mode above mentioned, forms small crystals, which appear to be hexaëdral prisms. It is of a white colour, and very acrid. It is not volatilisable; fuses at 200° of the centigrade scale, and loses thereby two atoms of water. It dissolves completely in water and alcohol, but in ether it is wholly insoluble. The sulphate of sabadillin crystallises in prismatic needles, is fusible, and contains four atoms of water, which may be driven off by simple fusion. The sabadillin agrees in its effects with veratrine, but is weaker.

The *gum resin*—(*sabadillin-monohydrat*), is yellowish, uncrystallisable, and feebly alkaline. When it is entirely dry, it is easily reduced to powder. Alcohol dissolves it in every proportion, as well as water and acids. It requires a temperature of 165° cent. to fuse it. Sulphuric ether dissolves only traces of it. In its properties, it bears much resemblance to the sabadillin, but differs essentially from it in not being crystallisable. Its composition varies but little from that of the sabadillin.

The *veratrin*,¹ whose effects on the animal economy are not yet known, is of a brownish colour, is insoluble in water and in ether, but not so in alcohol, and fuses at 185° of the centigrade scale. Concentrated acids decompose it, and nitric acid converts it into the oxalic.

Simon, an apothecary of Berlin, has recently affirmed, that he has found two alkaloids in the *veratrum album*; one of which possesses the property of being precipitated from its solution in acetic or phosphoric acid by the sulphuric acid and its salts, like baryta; hence he has given it the name *barytin*.²

¹ Riecke properly animadverts on the nomenclature of Couerbe. According to him, we have to distinguish not only the veratrine of commerce—that which was previously esteemed the simple alkaloid—but, also, the pure veratrine, (*la vératrine*), and the veratrin, (*le vératrin*.) The slight difference in the terms is insufficient to obviate confusion. Riecke, *Die neuern Arzneimittel*, u. s. w. S. 400. Stuttgart, 1837.

² *Pharmaceut. Centralblatt*. 1837, p. 191, & *Medicinische Annalen*, B. iv. H. i. S. 9. Heidelb. 1838.

EFFECTS ON THE ANIMAL ECONOMY.

Regarding the effects of veratrine on animals, Magendie¹ has the following remarks:—A very small quantity of acetate of veratrine placed in the nostrils of a dog, instantly excited violent sneezing, which continued for a long time. One or two grains, placed in the mouth, immediately occasioned profuse ptyalism. When a small quantity was introduced into any part of the intestinal canal, and the body was opened to notice its effects, the intestine was observed to be much indurated, and to relax and contract alternately for a certain length of time. The part of the mucous membrane, with which the veratrine is made to come in contact, is inflamed; the irritation spreads, and vomiting and purging are excited. In much stronger doses, the circulation is accelerated, as well as the respiration, and tetanus supervenes, soon followed by death. The effects are still more rapid, if one or two grains be thrown into the cavity of the pleura, or tunica vaginalis. In less than ten minutes death occurs, preceded by tetanic convulsions.

The same quantity thrown into the jugular vein, induced tetanus and death in a few seconds. Dissection showed, that, even in this case, the veratrine had acted on the intestinal canal, the mucous membrane of which was found injected. The lungs, also, exhibited traces of inflammation and engorgement.

Veratrine, in large doses, would, doubtless, exhibit the same effects on the human organism. The taste is very acrid, but without bitterness: it excites a copious flow of saliva, even when a small quantity only has been introduced into the mouth. Although it has no smell, it must not be brought too close to the nose, when in the state of powder, as it occasions, even in very minute quantity, violent sneezing, which may prove dangerous. A quarter of a grain immediately induces copious evacuations, and, in a somewhat larger dose, more or less violent vomiting.

According to Turnbull, who has immoderately, we think, extolled this remedy, its effect is very different, according as it is exhibited internally or externally. Externally, it may be applied for weeks and months, without the supervention of any of the effects that succeed its internal administration. Exhibited in this way, it diminishes internal nervous excitement, assuages pain, but does not act on the intestinal canal. In dropsical cases, it is stated to be

¹ Journal de Physiologie Expériment. i. 56; & Formulaire pour la Préparation, &c. de plusieurs Médicamens.

one of the greatest promoters of the urinary secretion that we possess. The part of the skin on which it is rubbed, either in solution or ointment, even when the friction has been continued for a long time, exhibits no evidence of irritation: when, however, the dose of veratrine has attained a certain extent, the patients feel a considerable degree of heat, and a kind of pricking sensation in the rubbed part, when it may be concluded, that the veratrine is active, pure, and genuine: under a more prolonged use of the remedy, this feeling of warmth and pricking extends over the surface of the whole body; and, in some cases, involuntary twitchings have been observed in the muscles of the mouth and eyelids. These symptoms, however, pass off, when the frictions are discontinued for a day or two. Only in a few cases, according to Turnbull, was any eruption induced by its application. The endermic use of the remedy, always, however, excited so much irritation as to prevent its repetition. Thus much for Turnbull:—

His views and experience have by no means been confirmed by the generality of observers. The external application of veratrine cannot always be used without local irritation ensuing. An English physician, labouring under rheumatism of the arm, rubbed upon it an ointment composed of twenty grains of veratrine to an ounce of lard; and, immediately afterwards, so much pain was induced in the part, that he was obliged to take opium to obtain rest; an eczematous eruption subsequently appeared on the arm, but the rheumatism remained uncured. Ebers applied it endermically, but witnessed nothing more than a violent burning in the part, such as is commonly the case with other agents. He frequently observed the pricking sensation mentioned by Turnbull, and often to such an extent as to be almost insupportable. According to the trials of Ebers, its diuretic effect was not restricted to dropsy, but was usually evinced in other diseases. The sensorium appears never to have been implicated, but when applied in small doses over the pit of the stomach it produced striking effects on the spinal marrow, and the nerves connected therewith, as the nerves of the thorax and abdomen: violent pain was experienced, which spread through the whole extent of the nerves distributed to the parietes of the abdomen, with a sense of traction along the spinal marrow, twitchings, great anxiety, orthopnœa, nausea and vomiting, and a feeling, which the patient was unable to describe, except that it was almost insupportable.

When given internally, veratrine soon caused nausea, retching, vertigo, and complete loss of appetite; so that Ebers soon aban-

doned its internal use, and, like Turnbull, gave the preference to the external.

Owing to the presumed effects of veratrine on the nervous system, and especially on the spinal marrow, and the nerves connected with it, its use was suggested in nervous diseases—particularly in neuralgia, prosopalgia, and ischias—in which it is said to have been found most efficacious by Turnbull, Ebers,¹ Brück, Suffert,² Professor S. Jackson,³ Cunier,⁴ and others. In no class of diseases, according to the first of these writers, have the beneficial effects of the ointment of veratrine exhibited themselves more strikingly, and by no other remedy has the same amount of relief been induced in so short a time. Even in tic douloureux, a single friction is said to have been sufficient to remove the disease without relapse. Two circumstances have here chiefly to be borne in mind,—*first*, the extent of the pain, for when it is not concentrated on a point, but spreads along the branches of the nerves, the cure is easier, and a weaker ointment is needed; and, *secondly*, the duration of the affection. In long protracted cases, a complete cure is far more difficult, and can, in general, be effected only after a long period. The paroxysms, however, may be relieved by an ointment composed of from twenty to forty grains to an ounce of lard. In this case, it must be strongly rubbed in, so as to excite itching of the skin: care must be taken, however, that the ointment does not touch the conjunctiva, as the smallest quantity of veratrine would induce violent inflammation. Ebers, likewise, found advantage from its use in chorea, hypochondriasis, and hysteria; and Turnbull in paralysis. Both extol it in rheumatism and gout, in relation to which Ebers remarks, that the remedy has appeared to him more efficacious when the nervous system, or some nervous branches, were predominantly affected, and when the gastric affection was entirely removed. In the cases treated by veratrine, relief was sooner obtained, and the cure was more speedy and complete, than where other agents were employed; the secretion of urine was augmented; restlessness disappeared; and sleep

¹ Casper's Wochenschrift, 1837. No. 47.

² Berlin. Medicin. Centralzeitung, 1837, p. 670, & Heidelberg. Medicin. Annal. B. iv. H. 1, S. 11.

³ American Journal of Pharmacy, vol. iii. new series, p. 186. Philad. 1838.

⁴ Bulletin Médical Belge, Dec. 1837, & Bullet. Général de Thérap. Dec. 1838. See, also, Forcke, Physiologisch-therapeutische Untersuchungen über das Veratria. Hannov. 1837: cited in Bib. Générale, Encyclographie des Sciences Médicales, Août, 1838.

returned, without any evidences of narcosis. As regards acute rheumatism, Turnbull remarks, that the veratrine is not to be preferred to antiphlogistics: in these cases, a weaker ointment must be used, (ten grains to the ounce :) in chronic cases, the quantity may be carried much higher; and—especially when extensive organic changes have supervened in the parts—it must be continued for a great length of time. In lumbago, ischias, and rheumatism of the chest, not more than one or two rubbings were generally necessary. In gout, according to Turnbull, it may be exhibited both internally and externally; in the former mode of administration, he compares its efficacy with that of colchicum: the latter method has been recommended, also, by Sir C. Scudamore. It was, likewise, found very advantageous by Bardsley¹ in chronic rheumatism.

Veratrine would seem, however, to have been most efficacious in cases of dropsy. “Unadulterated veratrine,” says Ebers, “acts often on the urinary secretion with magical powers, and it may seem fabulous, when I remark, that friction with a very weak ointment of veratrine two or three times in the twenty-four hours on the inner part of the thigh, or the back, epigastric region, or around the navel, has excited such a copious secretion of urine, that the patients, under its long continuance, began to feel weak; and the anasarca, and even the dropsical accumulation in the abdomen, in a short time almost disappeared—circumstances which indicate the caution that ought to be observed in apportioning the dose, when we are satisfied of the goodness of the article.” He properly remarks, however, that the veratrine, by augmenting the secretion of urine, may not remove the dropsy, but, by occasioning the absorption of the effused fluid, it allows the physician to examine as to the existence of organic mischief. Ebers gave the veratrine in many of the lighter hydropic cases, which follow intermittents and other forms of fever, and often with great and rapid success; likewise in twenty-four more serious cases, fifteen of which recovered, and one experienced relief: eight very complicated cases terminated fatally, and in four of these diuresis occurred; in four not.

Fricker² likewise obtained very good effects from the use of an ointment of veratrine in dropsy: but, on the other hand, Späth found it of no avail.

¹ Hospital Facts and Observations, illustrative of the efficacy of Strychnia, Brucia, Veratria, Iodine, &c. Lond. 1830.

² Würtemb. Medic. Correspondenzblatt, B. vi. S. 157 & 341; & Heidelb. Medicin. Annal. B. iv. H. i. S. 15.

Turnbull observed, from the internal use of veratrine, as well as from its application to the pit of the stomach, a diminution in the frequency and force of the pulsations of the heart; and in cases where these were more excited than natural, restoration of a regular circulation. He exhibited it, consequently, in heart diseases, especially in those of gouty and rheumatic diatheses, in simple nervous and gouty palpitation, and as a diuretic in organic heart diseases, in which it frequently seemed to afford relief.

The observation of Turnbull—that by the external application of veratrine, in chronic rheumatism, with swellings of the joints, these disappeared—induced him to try it in glandular swellings; he found, that in goître, in swellings of the mammary glands unaccompanied with pain, in buboes, and in scrofulous tumours of various parts, even in cases in which iodine had failed, it rendered essential service. It has, according to him, the advantage, that the skin is not subsequently irritated by it, and when, after the rubbing, the superfluous ointment is washed off with soap and water, the affected parts can soon afterwards be exposed to the air. Of an ointment formed of ten grains of veratrine to half an ounce of lard, a piece, about the size of a nut, is rubbed in for ten minutes twice a day, and every week the strength of the ointment is increased.

Magendie¹ recommends, that the veratrine should be given, also, as a drastic cathartic, especially where a speedy action on the bowels is needed. Prescribed with this view, it has been found effective in several aged persons, in whom a collection of excrement had formed in the large intestine. Turnbull advises it in the opposite condition of the bowels—in diarrhœa—given in the dose of half a grain—a disease in which, it is well known, our ordinary cathartics often prove extremely serviceable.

It would appear, that veratrine is an article which is frequently adulterated. Such, at least, is the opinion of many practitioners, and in this way they account for the discordance amongst observers as to its virtues.² The veratrine, with which Ebers made his first trials, was obtained from the French laboratories; it exhibited the whole power of this heroic agent: on employing, however, a new preparation, he found it entirely useless; and afterwards, with another, he derived all the benefit obtained from the first.

¹ Formulaire pour la Préparation, &c. de plusieurs nouveaux Médicaments.

² Ebers, & Riecke, Die neuern Arzneimittel, u. s. w. S. 407.

The observations of Ebers would induce us to give further trials to the veratrine; but we must confess, that our experience, thus far, has by no means confirmed the eulogiums of Turnbull; and this is the general sentiment, we think, of the profession. It has often been used externally by ourselves, as well as by many other American physicians, but has almost always fallen short of the mark. Riecke¹ affirms, that he has not seen the slightest effect from the application of the veratrine ointment.²

MODE OF ADMINISTERING.

Veratrine may be given either in pills or in spirituous solution; the dose being from one-twelfth to one-sixth of a grain several times a day. Externally, it is best administered in the form of ointment, or endermically. In the latter case, Ebers generally strews two grains on the denuded skin.

Pilulæ Veratrinae.

Pills of Veratrine.

- ℞. Veratrin. gr. ss.
Gumm. acaciæ,
Syrup. gum. acac. q. s. ut fiant pilulæ vj. pond. gr. j.

Dose.—One pill, to be repeated two or three times a day, according to circumstances. MAGENDIE.

- ℞. Veratrin. gr. ij.
Pulv. rad. glycyrr. gr. xij.
Ext. hyoseyam. gr. vj.

M. fiant pilulæ xij.

Dose.—One, three times a day.

TURNBULL.

Tinctura Veratrinae.

Tincture of Veratrine.

- ℞. Veratrin. gr. iv.³
Spiritus vini, ℥j. M.

¹ Op. cit.

² See, on the preparation, employment, action, and medicinal virtues of veratrine, Ebers, in Hufeland's Journal, B. lxxxvi. 1838.

³ In the Pharmacopée Universelle, of Jourdan, (ii. 643,) there is the serious error of directing ℥iv. in the preparation of this tincture, in place of four grains!

Dose.—Ten, fifteen, twenty, to twenty-five drops in a glass of water.—Given in dropsy. MAGENDIE.¹

Unguentum Veratrinæ.

Ointment of Veratrine.

℞. Veratrinæ, gr. v. x. vel xx.
Axungia, ℥j.

Misce intimè.

For external use. The size of a hazel-nut to be carefully rubbed in, morning and evening, or oftener, for from five to fifteen minutes. TURNBULL.

℞. Veratrin. ʒj.
Tere cum
Ol olivæ, ʒj.
Et adde
Unguent. cetacei, ʒvij. Misce.

Solutio Veratrinæ.

Solution of Veratrine.

℞. Veratrinæ, gr. j.
Aquæ destillat. ʒij. M.

A dessert-spoonful to be taken in one or two ounces of sugared water, in cases of tic douloureux. MAGENDIE.

Linimentum Veratrinæ.

Liniment of Veratrine.

℞. Veratrin. gr. viij.
Solve in
Alcohol.
Linim. sapon. aa. ʒss.

The SULPHATE OF VERATRINE—*veratrinæ sulphas*—possesses the same virtues as veratrine. Magendie gives the following form for internal administration :—

Solutio Veratrinæ Sulphatis.

Solution of Sulphate of Veratrine.

℞. Veratrinæ sulphat. gr. j.
Aquæ destillat. ʒij. Misce.

Dose.—ʒj to ʒiv in a mixture. The preparation has been suggested as a substitute for the *Eau medicinale d'Husson*.

¹ Magendie recommends that the tincture should also be used externally, in cases of dropsy or gout.

ZINCI CHLORIDUM.

SYNONYMES.—Zinci Chloruretum, Zincum Chloratum, Z. Muriaticum (Oxydatum,) Chloride, or Chloruret, Hydrochlorate, Muriate, or Butter of Zinc.

German.—Zinkchlorid, Salzsaures Zinkoxyd.

MODE OF PREPARING.

The chloride of zinc results,—if to any given quantity of pure muriatic acid, pure oxide of zinc be added by the aid of gentle heat, until no more is dissolved: the solution is then filtered, and evaporated in a porcelain dish to dryness; whereby a jelly-like—and, by high drying—firm, white, and, by careless drying, light brownish substance remains, of an austere, sourish, metallic taste, which must be rubbed to powder, and preserved in a closely stopped vessel.

The chloride of zinc is very deliquescent in the air, forming the *butter of zinc*, (*butyrum zinci*; German, *Zinkbutter*.) It is very soluble in water.

EFFECTS ON THE ECONOMY.

The chloride of zinc has been exhibited both internally and externally, but chiefly in the latter mode, especially in this country.

Papenguth¹ found a very dilute solution useful in flabby scrofulous ulcerations, applied in the form of lotion; and in sinuous ulcers, in the form of injections.

It has been especially recommended as a caustic, that does not exert any disagreeable influence, like the corrosive sublimate, arsenic, or the potassa fusa;—never causing violent pain in the affected parts, or any kind of irritative fever; or disordering the digestive organs, as some of the articles just mentioned. Hanke, indeed, advises that arsenic should be entirely banished from therapeutics as a caustic agent, and that the chloride of zinc should be substituted for it. He employed it with success in old, atonic ulcerations on the feet, in the strength of two grains to the ounce of distilled water: with this he wetted lint, and applied it two or three times a day. With like success he used it in old syphi-

¹ Nouveau Journal de Médecine, 1819.

litic ulcers, with extremely morbid surfaces and secretions: the chloride destroyed the degenerate formation, and effected cicatrization. In scrofulous and malignant herpetic ulcers, he prescribed a concentrated solution; in pityriasis he used it as a wash, and in wounds and ulcerations, with fungous formations, he applied it in a concentrated state: in phagedenic ulcers of the face, it effected a more certain cure than the method of Cosme,—the chloride being strewed a line thick, in a dry state, over the whole surface of the ulcer, the edges surrounded with adhesive plaster, and a plaster placed over the chloride of zinc, with compresses and an appropriate bandage. In *nævi materni*, *angiectasis*, &c., he applied it in the same manner, as well as in the *pustule maligne*, (*Milzbrandkarbunkel*.) Mr. Callaway,¹ of Guy's Hospital, London, employed it with considerable success in the cure of cutaneous and subcutaneous *nævi materni*. It was directed to be rubbed on the part until the skin became slightly discoloured, and to be repeated at intervals. Dr. Alexander Ure has found it extremely useful in the varieties of erosive ulcer called *lupus*, which were often speedily checked, and the disease permanently cured by the local use of the chloride. He applied it in a paste, made with one part of the chloride and two or three parts of the anhydrous sulphate of lime—a modification of Canquoin's formula, (see below,) which he recommended some years ago.² One or two applications of the paste were generally sufficient to produce a proper eschar, and when this was detached, the sore was treated with water dressing.³ In a late British periodical, a case is related by Dr. Davidson,⁴ of malignant ulcer under the left ear, which was cured by the un-mixed chloride of zinc, applied repeatedly until the ulcer assumed a healthy character.

Hanke used it likewise for the formation of issues, which it establishes in from six to eight hours; and, lastly, to excite rube-faction on the surface, either applied in the form of a solution of the chloride in water or wine, or mixed with oil or lard into an ointment, and rubbed on the skin: in this way, a gritty kind of eruption of a scarlet hue is induced, which is said to have afforded relief in paralysis of the limbs.

Wendt, Vogt, and Canquoin have highly extolled the chloride as a caustic, and it has been largely employed by the physicians and

¹ British Annals of Medicine, May 19, 1837.

² Lond. Med. Gazette, Dec. 19, 1835.

³ Ibid. Dec. 3, 1836.

⁴ Edinb. Med. and Surg. Journ. Jan. 1838.

surgeons of this continent, especially in the Philadelphia Hospital, and Pennsylvania Hospital, in similar cases to those mentioned above.

Dr. Davidson¹ is of opinion, that the chloride of zinc is only superior to many other caustics in cases where the destruction of a considerable thickness of texture is required, or where the removal of an excrescence by a caustic is preferred by the patient to the knife: the nitrate of silver seems, he considers, to be superior in promoting a sound action, when the unhealthy surface or stratum of the ulcer is superficial.

Hanke² has, likewise, used the chloride of zinc internally, with advantage, in cases of epilepsy, as well as in St. Vitus's dance; and has prescribed it, united with hydrocyanic acid, in prosopalgia. Hufeland, also, extols the solution of the chloride in all those neuroses in which the oxide of zinc is indicated, and especially in such patients as are not readily impressible.³

MODE OF ADMINISTERING.

Guttæ Zinci Chloridi.

Drops of Chloride of Zinc.

℞. Zinci. chlorid. gr. j.
Sp. æther. muriat. ℥ij. Solve.

Dose.—Five drops, every four hours, in a little sugared water; gradually increasing the dose to ten drops.

Lotio Zinci Chloridi.

Lotion of Chloride of Zinc.

℞. Zinc. chlorid. gr. viij.
Ext. aloes aquos. ℥ij.
Aquæ destill. ℥iv. Solve.

Applied to the dressings, in cases of atonic, scrofulous ulcers.

VOGT.

The chloride of zinc may be applied as a caustic, by means of a moistened hair pencil, either alone, or mixed with an equal portion of oxide of zinc, or sulphate of lime, or according to the following forms:—

¹ Op. cit., and American Journal of the Med. Sciences, May, 1839, p. 238.

² Rust's Magazine, xxii. 373; and Journal de Pharmacie, xvi. 549.

³ See Mérat & De Lens, Art. Zinc, (Chlorure de.)

Canquoin's Caustic Pastes.

	A.	B.	C.
℞. Zinci chlorid. p.	i.	i.	i.
Farinæ tritici p.	iv.	ij.	ij.
Aquæ fontan. ¹ q.	s. ut fiat pasta.		
℞. Zinci chlorid. p.	j.		
Farinæ tritic. p.	iss.		
Butyri antimonii, p.	ss.		
Aq. font. q.	s. ut fiat pasta.		

ZINCI CYANIDUM.

SYNONYMES.—Zincum Cyanogenatum, Z. Borussicum, Z. Zooticum, Z. Hydrocyanicum, Z. Cyanuretum, Hydrocyanate, Prussiate, or Cyanuret of Zinc.

French.—Cyanure de Zinc.

German.—Cyanzink, Blausaures Zynkoxydul, Blaustoffzink, Zinkecyanür.

This preparation was used in Germany for a long time before the process was made known.²

METHOD OF PREPARING.

According to Kunze, it is directed, in the Leipzie shops, to be prepared as follows:³

Any quantity of pure sulphate of zinc is dissolved in ten times as much distilled water; the fluid is then filtered, and decomposed by a solution of hydrocyanate of potassa, or hydrocyanate of lime; added by drops so long as a precipitate is formed. This precipitate, which consists of cyanide of zinc, must be carefully washed, dried, and preserved in a glass jar, from which the entrance of light is prevented.⁴

The hydrocyanate of zinc has the appearance of a white, tasteless powder, which is insoluble in water and spirit of wine, but dissolves in the stronger acids, with the disengagement of hydro-

¹ To each ounce of the chloride of zinc twenty-four to thirty drops of water may be added.

² Magendie, *Formulaire pour la Préparation, &c. de plusieurs nouveaux Médicaments, &c.*

³ Riecke, *Die neuern Arzneimittel*, u. s. w. S. 410. Stuttgart, 1837.

⁴ For M. Pelletier's method, see Magendie, *Formulaire, &c.*

cyanic acid. Well prepared and rubbed, it has a strong odour of hydrocyanic acid, and when moistened, or exposed to heat, it exhales hydrocyanic acid.

As to its medicinal effects and mode of administering, they are analogous to those of the following preparation: they are, therefore, given together.

ZINCI FERROHYDROCYANAS.

SYNONYMS—Cyanuretum Ferrozincicum, Zincum Ferrohydrocyanicum, Ferro-Hydrocyanate, or Ferrocyanate of Zinc.

German.—Eisenblausaurer Zink, Blausaures Eisenoxydul-Zinkoxyd, Zinkeisencyanür, Cyaneisenzink.

METHOD OF PREPARING.

According to Schindler,¹ this preparation is best made by the mutual decomposition of boiling hot solutions of eighty-three parts of sulphate of zinc, and sixty parts of ferrocyanate of potassa. If the sulphate of zinc be not entirely free from iron, it has a bluish lustre, which, after long washing with lime water, becomes of a reddish hue. If the bluish colour be manifested, some more sulphate of zinc must be added, and it must be digested until the precipitate appears entirely white.

Ferrohydrocyanate of zinc forms a white, insoluble, almost inodorous powder, which is somewhat soluble in the stronger acids, without exhaling a smell of hydrocyanic acid in the cold; but, by boiling, hydrocyanic acid is slowly disengaged.

EFFECTS ON THE ECONOMY.

Hufeland recommends the cyanide, or perhaps, the ferrocyanate of zinc in nervous diseases. According to him, from one to four grains may be given for a dose, two or three times a day, without any injurious effects;—the only inconvenience being, at times, slight nausea, but no diarrhœa, or disposition to obstructions, and no narcotic symptoms. In cardialgia, it afforded, in his hands, essential service, as well as in some cases of epilepsy, and in

¹ Riecke, *Op. cit.* S. 411.

paralysis. Henning,¹ likewise, found it useful in cramp of the stomach, in hysteria, and in spasmodic diseases of children, induced by worms. In epileptic attacks from teething, he also gave it with advantage;—the dose being from half a grain to a grain, three or four times a day. Clarus gave the cyanide (?) of zinc in epilepsy, but he observed no other result than less frequent and less severe attacks. Pohl saw no very decided effect from the remedy, which he gave in the dose of from one-fourth to half a grain. In the Berlin Polyclinic Institute, advantage accrued from it in two cases of St. Vitus's dance; it was begun with in the dose of one-third of a grain twice a day, which was gradually raised to fourteen grains a day. Klokow gave the cyanide of zinc—which Riecke suggests² was the cyanuret of zinc and potassium, (Cyan-zink-cyankalium,)—in spasmodic affections,—beginning at first with one-tenth of a grain, as larger doses occasioned colic, diarrhœa, and vomiting; and, when the patient became accustomed to it, gradually augmenting the dose to half a grain. Success, he affirms, followed its administration.³ Muhrbeck gave it, in violent periodical cephalalgia in the region of the left frontal sinus, with great benefit. He began with one-twelfth of a grain, and gradually raised the dose to a grain and a half. Müller and Günther confirm the reports of its efficacy in St. Vitus's dance: the first gave daily a grain; the latter, from half a grain to a grain, four times a day.

Kopp, who properly distinguishes the two preparations from each other, instituted experiments with each. The ferrocyanate of zinc he used with advantage in cramp of the stomach, general nervous disorders, nervous debility, neuralgia, nervous headach, and nocturnal pains in the bones. He gave it in the form of powder, with some sugar of milk, every two hours, or four times a day, in doses of one-twelfth to one-eighth of a grain, gradually increasing the dose. According to his observations, it occasions, with many persons, obstructions, but does not disorder the stomach. Kopp found the cyanide of zinc still more efficacious in the same disorders. Impressible patients, who suffered under unusual sensibility of the abdomen, took four powders daily, of one-sixteenth of a grain each, with marked benefit. In one case of neuralgia, in a man, he elevated the dose very gradually to half a grain four times a day. When, however, this quantity was exceeded, and the

¹ Hufeland's Journal, 1823.

² Op. cit. S. 413.

³ Hufeland und Osann's Journal, B. lxx. St. 2.

patient took five-eighths of a grain four times a day, hyperæmia occurred in the head, with constipation. In two cases of chorea of one side of the body, the ferrocyanate had no effect whatever.

Riecke¹ asserts, that his father used it several times in scirrhus of the pylorus with advantage.

MODE OF ADMINISTERING.

The cyanide (?) was applied externally, by Von Ammon, in scrofulous and incipient rheumatic inflammation of the eyes, as well as in catarrhal inflammation of the eyelids: he prescribed it suspended by means of gum arabic in a mixture of cherry-laurel water and tinctura opii.

On account of the insolubility of both the cyanide and the ferrocyanate, they are best given in the form of pill or powder.

The common dose of the cyanide is from one-sixteenth to one-twelfth of a grain several times a day, gradually increasing the dose to one quarter of a grain; of the ferrocyanate, the dose is from one to four grains two or three times a day. Riecke² advises—to prevent confusion—that when these articles are ordered, they should be respectively denominated, *Zincum hydrocyanicum sine ferro*, and *Zincum ferro-hydrocyanicum*.

Pilulæ Zinci Cyanidi.

Pills of Cyanide of Zinc.

℞. Zinci cyanid. gr. xv.

Succ. glycyrrh. ʒij.

Misce et fiant pilulæ lx.

Dose.—One, morning, noon, and night, gradually increasing the quantity. KOPP.

℞. Zinci cyanid. gr. vj.

Magnesiæ, gr. iv.

Pulv. cinnam. gr. iij. Misce.

This dose to be repeated every four hours, in nervous affections of the stomach, especially in cases of cramp. HENNING.

¹ Op. cit. S. 414.

² Ibid.

ZINCI IODIDUM.

SYNONYMES.—Zincum Iodatum, Zinci Ioduretum, Iodide, or Ioduret of Zinc.

German.—Iodzink.

This preparation is made by boiling together iodine and zinc in atomic proportions, or rather with an excess of zinc, in a flask of water, down to dryness, and subliming the residue. Iodide of zinc is thus procured in beautiful, colourless, prismatic crystals.¹

The iodide of zinc is very deliquescent, and cannot easily be retained in the solid form. When heated in open vessels, it is resolved into iodine and oxide of zinc. It is very liable to undergo spontaneous decomposition.

It has a caustic taste, and, when applied to a denuded surface, gives rise to considerable smarting. Dr. Ure² recommends an ointment, formed of a dram of the iodide to an ounce of lard, in cases where the external use of the iodide of potassium is indicated. Proutet advises it as a collyrium in scrofulous ophthalmia, of the strength of fifteen grains to six ounces of distilled water: and it has been employed to form an astringent injection, in the proportion of a grain to an ounce of water.

¹ *Annales de Chimie*, xci.

² *Dict. of Chemistry*, 2d edition, p. 516.

SUPPLEMENT.

I.—COMPRESSIO.

SYNONYMES.—Compression, Methodical Compression.
German.—Druck.

THIS valuable method of modifying the condition of the capillary or intermediate system of vessels, and, through it, the function of nutrition, has lately become more extensively employed in the treatment of disease. As a sorbefacient, in various hypertrophies, it has long been used wherever its agency was applicable, and its effects have been very decided.¹ Of late years, however, it has been proposed in inflammatory and other affections, in which it had been previously esteemed inapplicable. Upwards of twenty years ago, it was highly recommended in rheumatic affections by Dr. William Balfour,² of Edinburgh, and numerous cases were brought forward by him, and by others, to attest its efficacy. Since then, it has been advised by Guérin,³ in cases of phlegmonous erysipelas of the extremities; by Velpeau,⁴ in severe burns and phlebitis, and in inflammation of the synovial apparatus;⁵ and still more recently, Mr. James Allan⁶ has related three cases of phlegmasia benefited by a similar treatment;—two were of erysipelas of the lower extremities, and one of the face. In these, compression was of speedy and permanent benefit—the pain caused by it being very transient. He states, moreover, that he has found the bandage of very great service in

¹ Clinique Médicale de l'Hôpital Necker, p. 247, Paris, 1835; or the translation in the American Medical Library, first year. See, also, the author's General Therapeutics, p. 228. Philad. 1836.

² A new Mode of curing Rheumatism and Sprains without debilitating. Edinb. 1816.

³ Journ. Analyt. i. 93.

⁴ Ibid., and Bulletin Général de Thérapeutique, No. 16, Août 30, 1836.

⁵ Nouv. Bib. Méd., Août, 1826; and Mèrat & De Lens, Dict. de Mat. Méd., Art. Compression.

⁶ British Annals of Medicine, Jan. 27, 1837.

removing the pain and swelling of joints affected with acute rheumatism, after the more active degree of inflammation had passed away.

In cases of external inflammation, compression acts probably in two ways;—first, by diminishing the circulation in the intermediate system of vessels concerned in the pathological condition; and, secondly, by restoring tone to the over-dilated vessels; for it is in erysipelatous affections, in which this form of hyperæmia more especially exists, that we have found it of greatest advantage. At this very time, we have cases of erysipelas of the extremities under treatment by compression, which are greatly benefited. We are constantly, also, in the habit of employing compression, under the circumstances mentioned by Mr. Allan, in arthritic affections, which are usually attended with great effusion, and with the most satisfactory results.

From an observation of the good effects resulting from compression in analogous cases, it occurred to Dr. Fricke,¹ of Hamburg, that it might be employed with advantage in cases of orchitis, or swelled testicle, (*hernia humoralis*;) which is frequently very tedious, and requires means that are by no means easy of application. He, accordingly, had recourse to it, and the result was most satisfactory: he found that “the disease could be removed by it in a simple, easy, and surprisingly rapid way.” He is of opinion, that, generally speaking, compression may be employed in every kind of inflammatory engorgement of the testicle, whatever may have been its cause, and at all stages of the disease. In many cases, the pain was at first, in some degree, increased; and in some—especially when applied too tightly—it induced great pain; but this never continued long, the patient, in a short time, finding himself so much relieved as to be able to leave his bed and walk about the room. In many cases of recent origin, a single application of the compression was found sufficient; but when the disease was of longer duration—say from three to eight days—it was found necessary to repeat the compression two or three times. Swelling of the spermatic cord, if not very considerable, did not contraindicate its use; nor did other coexistent local affections, as buboes, ulcers, &c. When a general febrile state accompanied the orchitis, compression was found to be the best means for removing it, where the vascular action, at least, was not too considerable; although, in extremely rare cases, such was the effect of the compression itself.

When the pain was very severe, it was generally owing to the compression having been too strong, and the same was the case with certain signs of gastric derangement that occasionally supervened. In these cases, it was necessary to suspend the remedy, until the derangement

¹ *Zeitschrift für die gesamt. Medicin.* B. i. H. 1, Hamburg, 1836. See, also, *Brit. and For. Med. Rev.* for July, 1836, p. 253.

was removed, by the use of an emetic, or the application of a poultice to the stomach. These cases were, however, extremely infrequent.

The good effects of compression exhibited themselves very soon after its employment, and the speedy abatement of the pain was always the surest sign of its efficacy. If the pain continued for some hours to any considerable degree, a general disorder of the system might be looked for as explaining the failure of success.

In the summer of 1835, Dr. Fricke treated, in this manner, seventeen cases. Of these were cured;—in one day, one; in two days, four; in three days, four; in four days, two; in five days, three; in nine days, one; and in ten days, two. The three last were severe and unfavourable cases.

For the purpose of compression, Dr. Fricke employs sticking plaster, made very adhesive, but not of too irritating materials, and spread on strips of linen, of the breadth of the thumb. No preparatory measures, as leeches, cataplasms, &c. are required.

In slighter cases, the patient may stand before the surgeon leaning against the wall, or he may sit on the edge of a bed or sofa, in such sort that the scrotum may hang freely down. If the scrotum and neighbouring parts are much covered with hair, it must be removed; but, generally speaking, this is unnecessary.

The following is the method he adopts of applying the compression:—

The surgeon takes the scrotum in one hand, and separates the diseased from the sound testicle; whilst, with the other, he gently stretches the skin of the scrotum over the former: the spermatic cord is isolated in the same manner. If the swelling of the testicle be considerable, it must be held by an assistant. The surgeon now applies the first strip over the isolated spermatic cord, about a finger's breadth above the testicle, holding the end of the strip with his thumb, and passing it round the cord. He proceeds in the same manner with the second strip, which must cover the former either in part or altogether. The first part of the process must be carefully done; the strips must compress the cord closely; for this purpose, the cord must be kept approximated to the skin, which must be tightly stretched over it; otherwise, when the other extremity of the testicle is compressed, the upper end will be apt to slip upwards through the loose rings of adhesive plaster, which will not only occasion pain, but render the whole operation abortive. In this manner the surgeon proceeds, applying strip after strip, the last always lying over its precursor by a third of its width, until the thickest part of the testicle—where it begins rapidly to decrease in diameter—is reached. The mode of procedure is now changed; the surgeon lays hold of the part of the testicle already covered, and passes his strips longitudinally from above downwards over the lower portion of the testicle. In this

way, the rest of the testicle is closely enveloped and compressed. The proper degree of compression will, in most cases, be indicated by the speedy disappearance of the pain which had previously existed.

When both testicles are affected, they must both be included in the circular strapping—the testicle already covered serving as a point of support for the other, as there is not room enough for the application of the circular strips over the second, in the same way as over the first.

In some cases, where the skin is irritable, ulcerations take place: small slits may then be cut in the plaster, and a Goulard lotion be applied.

Generally speaking, the patient may leave his bed immediately after the strapping has been attached, and walk about the room; and, where the inflammation has not been great, he may even attend to light labour out of doors.

When the strapping becomes loose, it may have to be reapplied, but often one application is sufficient.

In orchitis, caused by blows or pressure, compression is regarded by Dr. Fricke as the best agency. If the inflammation runs very high, he usually applies leeches, in the first instance, and keeps on poultices for a day or two; but, in slighter cases, he has recourse immediately to compression. The principal advantages, which he considers this mode of treating orchitis to have over others, are: *First*. The speedy removal of the pain; *Secondly*. The quick removal of the disease itself; *Thirdly*. The simplicity of the plan, and the slight trouble given thereby to the patient; *Fourthly*. Its small expense: and, *Fifthly*. The comparatively slight care and attendance required on the part of the surgeon. The two last points, as he properly remarks, are of considerable importance in hospital practice.

Since this plan of treating orchitis was suggested by Fricke, it has been successfully employed by our hospital and other surgeons, although by no means extensively adopted. Several cases, too, have been mentioned by M. Déchange,¹ of Liège, formerly *chef de clinique chirurgicale* at the Hôpital de Bavière. Of twelve cases of acute orchitis, thus treated, three were cured in three days; and the remainder before the seventh day.

Of late, *Compression of the arteries*, as an antiphlogistic agent, has been revived by Goyrand, Malapert, and others; the object being to prevent the afflux of blood to a part labouring under hyperæmia. The origin of this idea has been a matter of recent controversy;² but, as Dezeiméris³ has remarked, it certainly is not due to the gentlemen who

¹ Bulletin Médical Belge, Août, 1838, p. 218.

² Gazette Médicale de Paris, No. 46, Nov. 18, 1837, and No. 47.

³ Ibid.

have engaged in it. Blaud compressed the carotid in brain fever; Autenrieth did the same, before Blaud, in cases of convulsions. Earl, in epilepsy; Livingston and Kellie, in rheumatism; Ludlow, in gout; and Parry, of Bath, half a century earlier, employed compression of the vessels in different diseases, with the clearest appreciation of its *modus operandi*.

Still more recently, Allier¹ has published a case of intermittent neuralgia of the lobe of the right ear, cured by compression of the primitive carotid of the same side: half an hour before the paroxysm, the compression was exerted, with interruptions of five minutes every quarter of an hour. He has, also, reported a case of neuralgia of the orbito-frontal nerve; and, subsequently, of the *nervus pudendus superior*, respectively cured by compression of the carotid, and abdominal aorta. The compression of the carotid of the affected side was continued for the whole forenoon, with pauses of five minutes every quarter of an hour. For the pudic neuralgia, the abdominal aorta was compressed for the space of three quarters of an hour: the neuralgia, in both instances, gradually ceased.

Lastly: M. Allier² employed compression of both carotids in a case of hydrophobia at the commencement of an attack; immediately, the convulsion ceased, and the patient became apparently exanimate. The family were alarmed, and would not permit a repetition of the experiment. The case ended fatally.

In paroxysmal diseases, the *ratio medendi* of compression is not the same as in inflammatory diseases. In the latter, the flow of blood towards the inflamed part is prevented by the compression of the arterial vessels proceeding to it; but when compression is exerted on the vessels in neuralgia and congenerous diseases, the new impression caused by the resulting irregularity in the circulation, and the modification in the nervous function induced thereby, break in upon the morbid catenation like the different agents that are classed under the head of antispasmodics, of which class we have elsewhere endeavoured to show—what, by the way, is not now contested by any eminent therapist—that we have none that can be regarded in any other light than as indirect agents.³

¹ L'Expérience, No. 16, Jan. 20, 1838.

² Ibid.

³ General Therapeutics, p. 380.

II.—CONTRA-IRRITATIO.

SYNONYMES.—Counter-irritation, Counter-action.

German.—Gegenreizung.

It is not the object of the author to enter into an explanation of the therapeutical application of counter-irritants, or revellents in general. This he has done at considerable length elsewhere;¹ but to refer to some agents not mentioned in the body of the work, to which attention has been revived, or first directed, of late years more especially.

I. AMMONIATED COUNTER-IRRITANTS.

Gondret's Ammoniacal Ointment; Granville's Counter-irritants—Antidynous² Counter-irritants.

Ammonia has long been used in different formulæ for exciting rubefaction and vesication of the cutaneous surface. When two parts of liquid ammonia are united with one part of suet, and one part of oil of sweet almonds, the mixture forms the *pommade ammoniacale* of Gondret, which has been used for a long time to excite a speedy revulsion in cases of chronic affections of the brain, incipient cataract, amaurosis, &c., as well as to cauterise the integuments deeply.³ To the advantages of this preparation, as well as of derivation in various diseases, M. Gondret has recently recalled the attention of practitioners in an *ex professo* treatise.⁴

Since the appearance of M. Gondret's last work, Dr. Granville⁵ has published a treatise on counter-irritation, which has given rise to much attention on both sides of the Atlantic,—partly in consequence of the strong encomiums he has passed on certain counter-irritant applications employed by him, and still more in consequence of the mystery which he threw around them, by keeping their preparation a secret, until the

¹ General Therapeutics, p. 333.

² A term coined by Dr. Granville. It ought to be "Antodynous," from *αντι*, "against," and *odynē*, "pain."

³ Considerations sur l'emploi du feu en médecine, suivies de l'exposé d'un moyen épispastique propre à suppléer la cautérisation, et à remplacer l'usage des cantharides, Paris, 1819; & Nouv. Biblioth. Méd. iii. 441, 1828.

⁴ Traité théorique et pratique de la Derivation contre les affections les plus communes en général, telle que la Plethore, l'Inflammation, l'Hémorrhagie, &c. Paris, 1837.

⁵ Counter-irritation, its Principles and Practice, illustrated by one hundred Cases of the most painful and important Diseases effectually cured by external Applications. London, 1838; and American Medical Library edition. Philad. 1838.

united voice of the profession had expressed the mingled feelings of surprise, indignation, and regret, which such conduct on the part of an individual, holding an elevated position in the ranks of the profession, naturally engendered. It is due, however, to Dr. Granville to remark, that on subsequently publishing his formulæ, he stated that he addressed his work to the public to impress all with the value of the agency, but that it would have been unwise in him to give precise formulæ to those who could not estimate the proper proportions of the ingredients; that every physician can apportion them; and that he had never concealed the formulæ from his friends, and always intended to give them to the world.¹

Dr. Granville describes two sorts of ammoniated lotions, of different degrees of power, which are prepared in the following manner:

Each kind of lotion consists of three ingredients:—1st. *The strongest liquor of ammonia*, A. 2d. *Distilled spirit of rosemary*, B. 3d. *Spirit of camphor*, C.

These are made as follows:

A. *The strongest liquor of ammonia*.—Saturate a given quantity of distilled water, contained in a glass receiver surrounded by ice, with ammoniacal gas, obtained in the usual way from a mixture of equal parts of hydrochlorate of ammonia and recently slaked lime, both reduced to a fine powder. The water may be made to take up nearly 800 times its bulk of ammoniated gas under the circumstances described; its specific gravity will then be about 872, and 100 parts of it will contain thirty-three parts of real ammonia, according to Sir H. Davy's tables. This solution of ammonia will, therefore, be more than three times the strength of the *liquor ammoniæ* of the Pharmacopœia of London, 100 parts of which, at a specific gravity of .960, contain only ten parts of real ammonia. Dr. Granville, therefore, called his "*liquor ammoniæ fortissimus*."

B. *Distilled Spirit of Rosemary*.—Take two pounds of the tips or small leaves of fresh rosemary, and eight pints of alcohol; leave the whole in infusion for twenty-four hours in a well covered vessel, and after adding as much water as will just prevent the empyreumatic smell, distil over seven pints. The Pharmacopœia of London directs the essential oil of rosemary to be distilled instead with rectified spirit. Such a preparation Dr. Granville found unsuited for his purpose.

C. *Spirit of Camphor*.—To four ounces of pure camphor add two pints of alcohol, so as to dissolve the camphor, which solution should be filtered.

The three ingredients, thus prepared, every medical man should keep always ready at hand, in well-stoppered glass bottles, so as to be able to make, extemporaneously, a counter-irritating lotion of any requisite

¹ London Lancet, Oct. 27, 1838.

strength, according to the nature of the case. But, for ordinary purposes, Dr. Granville advises that both a milder and a stronger ammoniated lotion should be kept ready prepared for use.

Lotio Ammoniata Mitior.

The Milder Ammoniated Lotion.

Assuming the quantity of lotion desired to be divided into *eight* parts, then the proportions of the ingredients will stand thus :

A—four eighths. B—three eighths. C—one eighth, or as follows :

℞. Liq. ammon. fortiss. ℥j.
 Spirit. rorismarin. ℥vj.
 ——— camphor. ℥ij. M.

Lotio Ammoniata Fortior.

The Stronger Ammoniated Lotion.

If the quantity desired be also divided into eight parts, then the proportions of the ingredients run as follows :

A—five eighths. B—two eighths. C—one eighth, or as follows :

℞. Liq. ammon. fortiss. ℥x.
 Spirit. rorismar. ℥ss.
 ——— camph. ℥ij. M.

Although the changes of proportion here may be deemed trifling, yet the strength of the lotion is such, that Dr. Granville never employs it, except in cases of apoplexy, and for the purpose of cauterisation.

Directions in Mixing the Ingredients.—A and B are gradually mixed together. The mixture becomes opalescent and somewhat turbid, and a peculiar, highly agreeable, ethereal smell is given out, different from the individual odour of either ingredient, although the extreme pungency of the ammonia is still discernible. “I have strong reasons to believe,” says Dr. Granville, “that, at this point of the operation, some particular change takes place, which imparts to the mixture of the two ingredients some of its valuable peculiarities as a counter-irritant described in my work; but what that change is, it is not my business to enter upon in this place: suffice it to say, that in a great number of experiments made with the ingredients separately, (for each of them acts as a counter-irritant on the skin,) and with them combined, the effects were uniformly different; those in the former case being found unequal to the production of those complete results which I trust I have justly promised to the profession. Ammonia alone (however strong) will not give rise to the effects I have described, though it has often stopped internal pain, and produced small blisters; but never has it succeeded in almost immediately producing a full vesication, as I have seldom failed to produce with the two ingredients mixed together, particularly after the third ingredient has been added.”

Before, however, that third ingredient is so added, it is desirable to clear the previous mixture, by the addition of a small quantity of alcohol, and to set the whole in a cool place. All the various precautions here mentioned may, upon an emergency, be dispensed with, when an immediate action is required, either to arrest pain or relieve deep-seated inflammation. But for the more delicate uses, particularly for instantaneous vesication, Dr. Granville recommends that the preparations should be obtained in the manner specified.

The lotion must always be kept in bottles with a glass stopper.

EFFECTS ON THE ECONOMY IN HEALTH.

The stronger of these lotions is a powerful agent. It gives rise in a few minutes to vesication over the whole surface to which it may be applied; almost as rapidly, indeed, as if boiling water were placed upon the part.

It need scarcely be said, that the strength of these lotions may be regulated so as to produce either full vesication, or simply rubefaction, by varying the quantity of the liquor ammoniæ.

The mode of applying these counter-irritants is, as in the case of the *Oleum Sinapis*, (p. 345,) first to impregnate with them a piece of cotton or linen, folded six or seven times, or a piece of thick and coarse flannel; and then lay either of these on the spot, pressing with the hand, at the same time, very steadily and firmly on the compress, over which there should be placed a thick towel, doubled several times, so that not only the evaporation of the lotion may be impeded; but the hand, employed in pressing the application to the part, may not suffer from direct or indirect contact with the liquid. Care must be taken that the ammonia does not reach the eyes or nose.¹

As a general rule, the application should seldom be kept on longer than from one to six or eight minutes; and, Dr. Granville affirms, it has often happened to him to find, that less than a minute was sufficient to produce the desired alleviation of pain and spasm. But, in order to excite the higher degrees of counter-irritation, as vesication and cauterisation, as many as ten or twelve minutes may be necessary.

EFFECTS ON THE ECONOMY IN DISEASE.

There can be no doubt, that the ammoniated counter-irritants are valuable agents in all those diseases, which are capable of being benefited by a sudden and powerful revulsion. It is chiefly, as we have elsewhere stated,² when the diseased action has been prolonged for a considerable

¹ Granville, *Op. cit.* Amer. edit. p. 39.

² *General Therapeutics*, p. 341.

period, and in affections, which belong to the neuralgic class, that rapid revulsions are productive of the most marked advantage. When the disease is of an acute character—as in the different phlegmasiæ—revulsives, which are more prolonged in their action, are—as a general rule—preferable. It is in the first class of affections, that his lotions are chiefly extolled by Dr. Granville; he urges the importance of the sudden vesication effected by them in the treatment of many serious disorders; and affirms that they arrest “nervous and muscular pain almost immediately, provided it does not depend on structural disease.” There is perhaps no agent—he remarks—except boiling water, which can, in the space of between three and ten minutes, give rise to as ample a vesication. But, as powerful and effective a revulsion can be accomplished by the actual cautery in various forms, and especially—as we shall see—in that of the moxa. This we say from observation; and it is a result to which just theory would lead us.

The ammoniated lotions are, however, devoid of the painful mental impression, which the dread of actual fire occasions; although we doubt not that, in many of the cases above referred to, such mental impression may exert an important agency in the cure.

Dr. Granville gives the following, not very classically arranged, list of diseases, which, in the course of nine years, have appeared to him to be benefited by his counter-irritants.

“ A. *Principally affecting the Nervous System.*

- | | | | | |
|---------------------------|---|------------|---|--------------------|
| 1. Acute neuralgia | { | periodical | } | Tic douloureux. |
| | | permanent | | |
| 2. Spasms | { | including | { | Epilepsy. |
| 3. Convulsions | | | | St. Vitus's Dance. |
| | | | | Hysterics. |
| 4. Cramp. | | | | |
| 5. Brow-ague. | | | | |
| 6. Tetanus or lock-jaw. | | | | |
| 7. Highly acute toothach. | | | | |
| 8. Nervous headach. | | | | |

B. *Principally affecting the Muscles and Tendinous Tissues.*

9. Rheumatism.
10. Lumbago.
11. Swelled and highly painful articulations.

C. *Principally affecting the Circulation.*

12. Headach from fulness of blood in the head.
13. Congestions and sudden attacks of blood in the head.
14. Sore throat.

¹ Lancet, Oct. 27, 1838.

- | | | |
|-------------------------|--|---|
| 15. Early inflammation. | $\left\{ \begin{array}{l} a. \text{ of the trachea and bronchia.} \\ b. \text{ of the lungs and their membranes.} \\ c. \text{ of the heart and pericardium.} \end{array} \right.$ | $\left. \vphantom{\begin{array}{l} a. \text{ of the trachea and bronchia.} \\ b. \text{ of the lungs and their membranes.} \\ c. \text{ of the heart and pericardium.} \end{array}} \right\} \begin{array}{l} \text{Tending} \\ \text{to} \\ \text{Consump-} \\ \text{tion.} \end{array}$ |
|-------------------------|--|---|

D. Diseases of a Mixed Character.

- | | |
|----------------------|---|
| 16. Suppressed gout. | $\left\{ \begin{array}{l} a. \text{ Affecting the heart.} \\ b. \text{ Affecting the stomach.} \end{array} \right.$ |
|----------------------|---|
17. Genuine gout.
18. Paralytic debility.

E. Accidental, Mechanical, and Cutaneous Derangements.

19. Violent sprains.
20. Pimples.
21. Biles.
22. The ringworm."

Dr. Granville does not affirm, that all these disorders, and their modifications, have yielded to the ammoniated counter-irritants; or that the counter-irritants were always the sole agents employed. On the contrary, a few of them, he says, on particular occasions, resisted that agency; others were only momentarily benefited; and a few more required the simultaneous employment of ordinary and internal remedies to assist in, and complete, the cure.

Among the exceptions to the general rule of success, he enumerates chronic tic douloureux; chronic rheumatism of long standing; epilepsy, dependent on organic mischief in the brain, or any part of the spinal apparatus; and rheumatic gout, in persons whose constitutions had been completely shaken by that disorder, or by any other previous disease, although, even in this case, some good was obtained from using the ammoniated counter-irritants. The second and fourth of these disorders are of that number which require, in addition to the ammoniated applications, an appropriate internal treatment. The other two, Dr. Granville has found to be only partially relieved, but never cured by counter-irritating lotions.¹

In many of the disorders, referred to by Dr. Granville in the table given above, his ammoniated counter-irritants have been employed both in public and private in this country, and especially, perhaps, in this city. The effect in nervous and spasmodic diseases, in neuralgic and deep-seated rheumatic pains, has at times been very striking. Severe pains have yielded rapidly, as described by Dr. Granville; hyperæmiæ of particular organs have been diverted elsewhere, especially after blood-letting and sedatives had been premised; and, in short, whenever revel-

¹ Op. cit. p. 29.

lents, sudden and rapid in their action, have been demanded, the ammoniated counter-irritants have effected every thing that similar powerful revellents were capable of accomplishing,—but no more. We are in the habit of having recourse to the moxa in congenerous affections, and—as we have before remarked—with equally satisfactory results. There is one objection, too, that applies to the use of these strong lotions;—the sloughs and sores induced by them are often considerable, and remarkably difficult to heal. This, it is true, may be partly prevented, by being careful that the application is not too long continued; but, with the greatest caution, these results will, at times, supervene. When such is the case, simple dressings, with emollient poultices, will be found the best applications.

2. MOXA.

SYNONYME.—Moxiburium.

By the term *moxa*, the Chinese and Japanese designate a cottony substance, which they prepare by beating the dried leaves of the *artemisia chinensis*, a kind of mugwort. With this down they form a cone, which is placed upon the part intended to be cauterised, and is set fire to at the top.

This mode of exciting counter-irritation has been long practised by the Chinese and Japanese, and by the ruder nations of the old world; but it was not much employed in Great Britain and France until about the commencement of the seventeenth century, when it was introduced through the agency of a physician¹ who had resided in India. It fell again, however, into disuse, until attention was redirected to it, during the last century, by Pouteau² and Dujardin, and, at the commencement of this century, by Percy and Laurent,³ Larrey and others.⁴

MODE OF PREPARING.

Various agents have been used by different people, in “moxibustion,”—for so the mode of cauterisation has been termed, which consists in placing some combustible substance on a part of the body, and suffering it to burn down. From the earliest ages, the Nomades employed the

¹ Ten Rhyne, *Medit. de veteri Medicin.*; *Dissert. de Arthritide*, Lugd. Bat. 1672; and Kæmpfer's *History of Japan*, translated by Scheuchzer, vol. ii. *append. sect. iv.* Lond. 1728.

² *Mélanges de Chirurgie*, p. 49.

³ *Dictionnaire des Sciences Médicales*, Art. Moxibustion.

⁴ See, for a history of the moxa, the author's translation of Baron Larrey's *Memoir on the use of the Moxa*. Lond. 1822.

fat wool of their flocks, as well as certain spongy substances growing upon oaks,¹ or springing from the hazel;² the Indian the pith of the reed,³ and flax or hemp impregnated with some combustible material;⁴ the Persian, the dung of the goat; the Armenian, the agaric of the oak; the Chinese and Japanese, the down of the artemisia; the Thessalian, dried moss;⁵ the Egyptians, the Arracanese, and several oriental nations, cotton;⁶ the Ostiaks⁷ and the Laplanders,⁸ the agaric of the birch; and the aborigines of this continent, rotten and dried wood. Hippocrates⁹ was in the habit of employing fungi and flax for the same purpose.

In modern times, also, various substances have been used for the fabrication of the moxas. Whatever article is selected, it ought to be a spongy, light, vegetable matter; readily combustible, and so prepared as to burn down slowly. In Germany, they use the tinder—*amadou*—which is known to be an agaric prepared for the purpose; and it is not uncommonly employed in our hospitals,—a small disc or cylinder being placed on the part, and set fire to. The match used by artillerists was recommended by Percy,¹⁰ after Bontius:¹¹ it is composed of hemp steeped in a solution of nitre. He likewise proposed the pith of the sunflower—*helianthus annuus*—recommending, that the stalk should be cut into cylinders of the desired length, the bark being left on; so that, when ignited, it may burn in the centre and be held with the hand.¹² This, he calls *moxa de voleurs*.¹³

The moxa, used by Larrey, and very generally employed by many practitioners, is made by taking a quantity of cotton wool, pressing it somewhat closely together, and rolling over it a piece of fine linen, which is fastened at the side by a few stitches. Larrey advises, that it should have the shape of a truncated cone—the form usually adopted—and be about an inch long. Commonly the cylinder is shorter than this; six or eight lines—as, when above six lines high, the combustion is not felt—and about four or five lines broad. The moxas, employed by Dr.

¹ Hippoc. lib. de Affect. cap. xxx.

² Paulus Æginet. lib. vi. cap. 49.

³ Kæmpfer, vol. ii. app. sect. iv. p. 36.

⁴ Bontius de Medicina Indorum, p. 32.

⁵ Percy, in Pyrotechnie Chirurgicale pratique, p. 12.

⁶ Prosper. Alpin. de Medicina Ægyptiorum, lib. iii. cap. 12.

⁷ Voyages de M. Pallas, iv. 68.

⁸ Acerbi's Travels through Sweden, Finland, and Lapland, ii. 291, and Linnæus, in Lachesis Lapponica, translated by Sir James Smith, i. 274.

⁹ De Affect. cap. viii.

¹⁰ Op. cit. p. 77. Paris, 1811.

¹¹ Op. cit. p. 32. Paris, 1645.

¹² Art. Moxibustion, in Dict. des Sciences Médicales.

¹³ Mérat & De Lens, Dict. de Mat. Méd., Art. Moxa.

Sadler,¹ of St. Petersburg, are about half an inch in diameter, and three quarters of an inch in height. They are composed of a nucleus formed of the pith of the sunflower, wrapped in layers of cotton, of various thickness, and surrounded with an external envelope of thin muslin; both of the latter being previously steeped in a solution of nitre. They are held, while burning, by means of two long hair pins, the legs of which are slightly bent, in order to accommodate them to the shape of the moxa; and, when the latter is burned down to the place where it is held by the first hair-pin, it can be held with the other, and retained in its proper position. With this last view, Larrey² has a special *porte-moxa*, consisting of a ring to receive the cylinder, with a handle attached to it, and three small supports or knobs of ebony, placed beneath the ring, to prevent the heated metal from acting upon the surface.

Of late years, a plan for raising vesication on the surface has been adopted, which, as Dr. Granville remarks, must be regarded as a kind of moxa.³ This, he admits, is equally successful with the one he proposes, and which we have already described, (p. 396,) in forming a rapid vesication; “but it is, at the same time, so complicated, and attended by such intense pain,” that, in practice, he says, it will not bear comparison with the preparations which he recommends. A piece of linen or paper, being cut of the requisite size, is immersed in spirit of wine, or brandy. It is then laid on the part to be blistered, care being taken that the moisture from the paper or linen does not wet the surrounding surface. The flame of a lighted taper is applied quickly over the surface, so as to produce a general ignition, which is exceedingly rapid. At the conclusion of this operation, the cuticle is found detached from the true skin beneath.

In the application of the various moxas, or of most of them, their agency can be so graduated as to produce either simple rubefaction, vesication or the formation of an eschar. Where it is desirable to produce the first result only, the cylinder of cotton may be removed when the pain becomes somewhat severe; or the burning material may be held close to the surface, and be moved gradually along it. In this manner, a counter-irritant effect may be exerted along the spine or any extensive surface. Any burning substance—a lighted coal for example—will answer for this purpose. When vesication is needed, it must be kept on longer; and if it be desirable to produce an eschar, the moxa may have to remain on until it is wholly consumed. Larrey,⁴ indeed,

¹ Zeitschrift für die gesammte Medicin. B. iii. H. ii. & iii. and British and Foreign Medical Review, July, 1837, p. 217.

² The author's translation of his Essay on the Moxa, p. 5.

³ Counter-irritation, its Principles and Practice, Amer. Med. Library edit. p. 21 and p. 42. Philad. 1838.

⁴ Op. citat. p. 5.

advises, that the blowpipe should be occasionally employed to hasten the combustion. When the integument has once become disorganised, the slough will be thrown off in due time, leaving an ulcer. Larrey says the sloughing can be prevented by the application of liquid ammonia¹ to the burnt surface, after the moxa has been removed. This will do when the disorganisation is partial; but we know, from experience, that it often fails.

EFFECTS ON THE ECONOMY IN DISEASE.

The moxa—in its different forms—is doubtless a most valuable agent, where rapid counter-irritation is indicated. It resembles, indeed, in its action, the ammoniated counter-irritants of which we have already treated, and is applicable to the same diseases;—the only difference between them—when cauterisation is effected—being, that the agent in the case of the ammoniated lotion is a *potential*, in that of the moxa an *actual*, cauterant.

The moxa must be regarded as one of our most valuable revellents.

III.—GALVANISMUS.

SYNONYMES.—Galvanism, Electricitas Animalis, E. Galvanica seu Metallica, Irritamentum Metallorum seu Metallicum.
French.—Galvanisme.

The ordinary effects of common and galvanic electricity and of electro-magnetism are so well known, as to require but little comment. They are decidedly excitant; and, like all excitants, when applied to a part of the frame, are counter-irritant or revellent. All have been employed in paralysis—general and local,—amaurosis, deafness and dumbness of recent duration, asthma, rheumatism, neuralgia, &c. The effect, however, which galvanism exerts on the contractility of the muscular fibre, and the great similarity, in its agency, to the nervous influence,² has led to its employment more frequently in the various nervous and spasmodic diseases referred to, and in others belonging to the same class. Resting on his views of the absolute identity between the nervous and the galvanic fluids,³ Dr. Wilson Philip employed it in many diseases, and especially in asthma. In a paper read by him before the Royal Society of London, in January, 1816, he details some experiments, which he made on rabbits.

¹ Ibid. p. 9.

² See the author's Physiology, i. 88, 3d edit. Philad. 1838.

³ Experimental Inquiry into the Laws of the Vital Functions, Lond. 1817.

The eighth pair or pneumogastric nerves were divided by incisions made in the neck. After the operation, the parsley, which the animals had eaten, remained unchanged in their stomachs, and after evincing much difficulty of breathing they seemed to die of suffocation. But when, on other animals, whose nerves had been divided, the galvanic agency was transmitted along the nerve, below its section, to a disc of silver, placed closely in contact with the skin of the animal, opposite to its stomach, no difficulty of breathing occurred. The galvanic action being kept up for twenty-six hours, the rabbits were then killed and the parsley was found digested.

The removal of dyspnœa in these cases led Dr. Philip to employ galvanism as a remedy for asthma; and, by transmitting its influence from the nape of the neck to the pit of the stomach, he gave decided relief in every one of twenty-two cases, of which four were in private practice, and eighteen in the Worcester infirmary. The power employed varied from ten to twenty-five pairs of plates. Since then, galvanism has been repeatedly used in such cases, and at times with marked relief. Commonly, however, the plates, described hereafter, are employed for this purpose. The disease is unquestionably in the majority of cases dependent upon erethism of the pneumogastric nerves; all the phenomena indicate, that there is a spastic constriction of the small bronchial tubes, occasioned by irritation at the extremities or in the course of the nerve. The new impression, made by the galvanic agency, breaks in upon the concentration of nervous action, by exciting other portions of the nervous system, in the same manner as we observe spasms or ordinary cramp relieved, or paroxysmal diseases warded off, by agents that are capable of suddenly impressing some part of the nervous system.

Not long after these researches of Dr. Philip, galvanism was employed satisfactorily by Mr. Mansford¹ in a congenerous disease—epilepsy—and his plan was afterwards—although tardily—extended to some other paroxysmal disorders. The mode of application, recommended by Mansford, is as follows:

A portion of the cuticle, of the size of a sixpence, is removed by means of a small blister on the back of the neck, as close to the root of the hair as possible; and a similar portion is removed from the hollow, beneath, and on the inside of, the knee, as the most convenient place. To the excoriated surface on the neck, a plate of silver, varying—according to the age of the patient—from the size of a sixpence to that of a half crown, is applied, having attached to its back part a handle or shank, and to its lower edge—and parallel with the shank—a small staple, to which the conducting wire is fastened. This wire passes down the back, until it reaches a belt of chamois leather, buttoned round the waist; it then

¹ Researches into the nature and causes of Epilepsy, &c., Bath, 1819.

follows the course of the belt to which it is attached, until it arrives opposite the groin of the side on which we desire to employ it; it then passes down the inside of the thigh, and is fastened to the zinc plate in the same manner as to the silver one. The apparatus, contrived in this way, is thus applied. A small piece of sponge, moistened in water, and corresponding in size to the blistered part of the neck, is first placed directly upon it; over this, a large piece of the same size as the metallic plate, also moistened, is laid, and next to this, the plate itself, which is secured in its situation by a strip of adhesive plaster passed through the shank in its back; another above, and another below it. If these be properly placed, and the wire, which passes down the back be allowed sufficient room that it may not drag, the plate will not be moved from its position by any ordinary motion of the body. The zinc plate is fastened in the same manner, but in place of the second layer of sponge, a piece of muscle answering in size to the zinc plate is interposed; that is—a small piece of moistened sponge being first fitted to the exposed surface below the knee, the piece of muscle moistened, or—what we have found equally effectual and less inconvenient—a piece of moistened flannel¹ follows, and on this the plate of zinc.

The apparatus, thus arranged, will continue, according to Mr. Mansford, in gentle and uninterrupted action from twelve to twenty-four hours, according to circumstances. “This last is the longest period that it can be allowed to go unremoved; the sores require cleaning and dressing, and the surface of the zinc becomes covered with a thick oxide, which must be removed to restore its freedom of action: this may be done by scraping or polishing; but it will be better if removed twice a day, both for the greater security of a permanent action, and for the additional comfort of the patient.”

The adoption of this plan of treatment in cases of *tic douloureux*, the confidence reposed by Laennec in the use of galvanic plates on the breast and back in *angina pectoris* and similar neuralgic affections of the chest, and the communications of Drs. Harris and Chapman, brought it into very extensive use, so that ample trial was given to it in this country both in public and private practice. In three cases, it was—to employ the language of Professor Chapman²—“triumphantly directed” by Dr. Harris; but it was only found effectual in affections of the face; and in these cases it had to be persevered in for some time before marked benefit was experienced.³ About the same period, this mode of applying galvanism was recommended by Dr. Miller,⁴ of Washington University, Baltimore,

¹ Dr. Chapman says soft buckskin or parchment. *American Journal of the Medical Sciences*, Aug. 1834, p. 311.

² *Op. citat.* p. 311.

³ Dr. Harris, in *Amer. Journal of the Medical Sciences*, Aug. 1834, p. 384.

⁴ *Ibid.* p. 321.

and a case of paraplegia and another of general paralysis were adduced by him in which it was found highly efficacious.

There are doubtless—as we have observed—cases in which the excitant and revulsive agency of galvanism may be employed with advantage, but they are not so numerous as was at one time believed. We have used the plates extensively—in neuralgic cases especially—but have not experienced so much success, as to induce us to advise them frequently, under the inconvenience that necessarily accompanies their employment. They are, indeed, at this time, but little used.

Some years ago, Professor Von Hildenbrand, of Pavia,¹ recommended, in cases of frontal neuralgia, an *anodyne metallic or galvanic brush*, which appears to have been as effectual in his hands as the galvanic plates in those of Dr. Harris. It consists of a bundle of metallic wires not thicker than common knitting needles, firmly tied together by wire of the same material, so as to form a cylinder of about four or five inches long, and an inch or three fourths of an inch in diameter. This is applied to the pained part, previously moistened with a solution of common salt; and, according to Von Hildenbrand, it at times produces relief so instantaneous, that it appears to the patients to act like a charm. In his first experiments, he employed brushes constructed of two kinds of metal,—for instance, of silver and copper wire, copper and zinc wire, or zinc and brass wire, the individual wires being mutually commingled; but he subsequently ascertained, that bundles of wires of one and the same metal produced an effect scarcely less speedy, and that solid metallic bodies acted in a similar manner, but in a much feebler degree. The nature of the metal he thinks occasions no difference.

It is not probable, however, that, in these cases, galvanism is the agency concerned. Like the metallic tractors of Perkins, the effect is probably induced by the new nervous impression made through the excited imagination of the patient.

ANIMAL MAGNETISM—Mesmerism, Neurogamia, Biogamia, Biomagnetismus, Zoomagnetismus, Tellurismus, Exoneurism, as it has been termed—exerts an anodyne influence in probably the same manner. In highly impressible persons, more or less prolonged impressions made upon the senses—as by the operator looking steadfastly in the eyes of the patient, holding her thumbs or hands in his at the same time, or making passes in front of her—will induce an hysteric or hysteroid condition, in which the patient may fall into what is called “magnetic sleep,” of a very sound, and at times cataleptic, character: during the existence of this sleep, she may be insensible to certain irritants, and yet extremely alive to others, so that operations—as the extraction of teeth, and even some of a more serious character—may be performed without eliciting

¹ Edinburgh Medical and Surgical Journal, April, 1833.

the ordinary evidences of feeling. In cases of delirium tremens, accompanied by watchfulness, in which we have the whole nervous system extremely impressible, sleep may be at times induced by the employment of this agency, which has resisted the ordinary anodynes.¹

Lastly. Of late years, it has been proposed to introduce into the rectum, in cases of constipation, a kind of *galvanic suppository*, made of two metals—zinc and copper—and various forms of instruments have been devised by the prolific imaginations of the inventors; those intended for the rectum simply, were doubtless of advantage, at times, by virtue of the excitation they induced in the nerves of the mucous membrane. Others, formed somewhat like a bassoon—and so arranged as to have one metal in the mouth and the other in the rectum connected together by metal—did not appear to act differently from those of the simpler form. Both have gone into disuse, and—as we have said elsewhere²—if their efficacy on the frame has not been well marked, they have not failed to minister to the pockets of their inventors.

III. INJECTIONS OF AIR, VAPOUR OF ETHER, &c. INTO THE EUSTACHIAN TUBE.

An important improvement, in the understanding and treatment of diseases of the ear, has resulted from the attention that has been paid, of late, to the pathological condition of the Eustachian tube, and the means through it of rectifying certain morbid states of the organ of hearing. A mystery has been thrown, or attempted to be thrown, over the diseases of the ear, and as a consequence, they have furnished largely to empiricism; so that an exclusive aurist has been, too often, perhaps, esteemed synonymous with an exclusive empiric. Now, that the physiology of the outer and middle ear is better understood, their pathological relations are no longer environed with the same difficulties. The attention of the surgeon has to be first directed to the meatus externus, and if he discovers any obstacle,—as hardened cerumen,—which prevents the vibrations of a sonorous body from reaching the membrana tympani, such obstacle must be removed. If no defect exists there, he inquires into the state of the Eustachian tube, to detect, whether it be pervious so as to permit a free passage for the air from the throat to the middle ear—any impediment to which is a common cause of deafness; and, lastly, if the tube is found in a state of integrity, his attention is turned to the condition of the nerve, to discover whether the defect—organic or func-

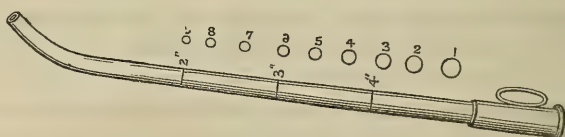
¹ Dr. Vedder, in *American Medical Intelligencer*, Feb. 1, 1839, p. 331.

² *General Therapeutics*, p. 248, Philad. 1836.

tional—be seated there. Such are the main subjects of inquiry in cases of deafness; although the condition of the membrana tympani, of the ossicles, and the mastoid cells become interesting incidental objects of inquiry.

Chronic inflammation of the Eustachian tube occasionally gives rise to stricture or narrowness of the tube; and, at others, to obstruction of the tube by means of mucus, or to accumulation of mucus in the tympanic cavities. In the former case, catheterism is demanded; in the latter, injections of air, in addition.

For the purpose of catheterism, various instruments have been employed. The catheter of Itard is a conical silver tube, curved at the extremity, with a slight enlargement to prevent laceration of the membrane. Kramer's instrument is a modification of that of Itard; the curve is more gradual, and the enlarged or button point is omitted. It is made of silver, six inches long, and of a calibre varying from the size of a small crow-quill to that of a large goose-quill. The extremity is well rounded, and it is curved, only to the distance of five lines from the point, exactly at an angle of 144° , so as to correspond with the lateral situ-



(Reduced one half.)

ation of the mouth of the Eustachian tube. It is of the same calibre throughout its whole length, and provided with a funnel-shaped dilatation at the outer extremity, half an inch in length, to admit the pipe of the injecting syringe, &c. To this part is attached a ring, on the same level with the beak of the catheter, by means of which the situation of the beak can be ascertained, when the instrument is introduced.

The catheter is farther graduated in inches, which is convenient in repeated introductions.¹

When it is requisite to sound the Eustachian tube, a piece of catgut may be passed through the instrument.

The catheter recommended recently by Mr. Pilcher² admits of being passed farther into the tube, and has a more gradual curve.

Deleau employs a flexible elastic gum catheter, which the patient

¹ Kramer, on Diseases of the Ear, chap. 2, Amer. Med. Library Edit. Philad. 1838.

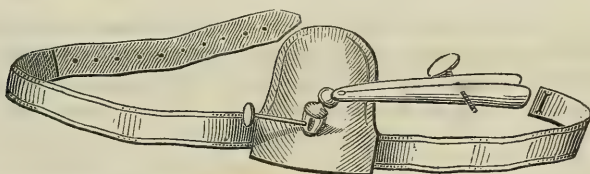
² A Treatise on the Structure, Economy and Diseases of the Ear, p. 304, Lond. 1838.

³ Op. cit. p. 305.

learns readily to pass into the Eustachian tube, and, by turning down the outer extremity, is able to inflate the tube with his own breath. This we have seen done repeatedly.

The silver instrument being slightly warmed and oiled, is introduced, with its convexity upwards, along the floor of the nostrils until the point reaches the pharynx; it is then gently turned, so that the point shall be outwards and a little upwards, the aperture of the Eustachian tube being above the level of the floor of the nose; in this way, the tube enters, and is readily felt by the operator to have done so. The instrument is then carried onwards, until its farther progress is prevented by the narrowness of the tube. Mr. Pilcher's instrument is of such dimensions as to frequently occupy three quarters of an inch of the tube; but if it be pushed beyond the fibro-cartilaginous portion—or that part of the tube, which readily admits it—the mucous membrane may be lacerated, and pain will certainly be produced.¹

When Mr. Pilcher's catheter is fairly introduced, it will remain without support, an advantage it possesses—in the opinion of its proposer—over those of Itard and Kramer, which require a frontal bandage to retain them in situ. Itard's is represented in the accompanying figure. It consists of a middle piece made of metal, bent so as to fit the arch of



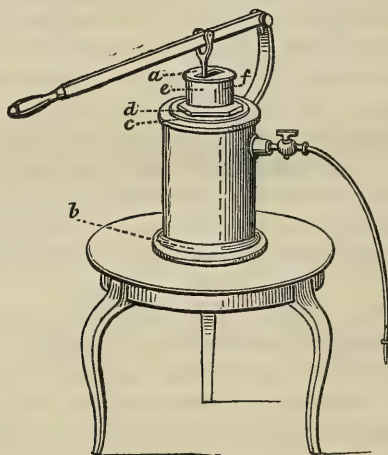
the forehead, and slightly padded within; to this are attached two straps, which fasten with a buckle. To the centre of the middle piece, a pair of forceps are attached, which move in a ball and socket joint, and the blades of which are brought together by a screw. The bandage is applied, before the catheterism is commenced; and when the instrument is introduced, the forceps are brought down, and screwed tight on the catheter, so as to retain it in position.

Through the catheter, thus introduced, aurists were in the habit of introducing lukewarm water through the Eustachian tube into the cavity of the tympanum; but owing to certain objections that apply to the employment of fluids, Deleau² suggested the air-douche or injections of

¹ Op. cit. p. 305.

² Sur le Cathétérisme de la trompe d'Eustache, &c., Paris, 1828; Itard in *Mém. de l'Acad. Royale de Médecine*, Tom. v. Fasc. 4, Paris, 1836; and translation in *Medical and Surgical Monographs*, vol. 1, p. 75, of Amer. Med. Library, p. 86, Philad. 1838.

air for the purpose of clearing the cavity ; and this is regarded by Kramer¹ as a great improvement. With the view of increasing and regulating the force with which the air is sent into the cavity, both these gentlemen invented air-pressers or condensers. The figure beneath represents that of Kramer.



c b is a cylinder, $10\frac{1}{2}$ inches high, made of molten brass ; the diameter of its calibre is $4\frac{1}{2}$ inches, and it is fastened at *b* with strong screws, on a strong oaken stand of the height of an ordinary stool. Within the cylinder *c b* is a pump barrel of wrought brass screwed into it, which measures $10\frac{1}{2}$ inches in height, and $2\frac{1}{2}$ inches in diameter, rising at *d* *a* 3 inches out of the cylinder, so that the whole machine *a b* is about 13 inches high. In the piston of the pump barrel, there is a valve for the passage of the air, which besides passes in at the opening situate at *d*. There is a second valve in the bottom of the pump barrel, through which the air is forced into the interior of the cylinder.

When air is injected into the tympanum, it may be heard to strike against the membrane, and to rush through the cavity into the mastoid cells, and thus may become a means of exploring the condition of the middle ear.

Mr. Pilcher,² however, observes, that from his daily experience of the great facility with which air and fluids may be introduced into the tympanum, and regulated, both as to quantity and force, by means of a common syringe accurately fitted to the catheter, he does not hesitate to declare his conviction, that the ceremony and inconvenience of the air-press may be dispensed with. He recommends that the operator should merely steady the instrument with his left hand, whilst he uses the syringe with his right. By this means, any fluid or gas injected through the catheter,

¹ Op. citat. p. 164.

² Op. cit. p. 307.

may be brought in contact with the mucous membrane, and thus stimulate the nerves of the cavity.

Nor is the air-press entirely devoid of danger. Very recently, a case has been detailed in which, after "pumping air" four times through the nostrils into the Eustachian tube, immediately on removing the instrument from the nostril, the patient fell back in the chair and never spoke afterwards.¹ The sudden shock to the nervous system was probably the cause of death; and it has been suggested, that to avoid too great a degree of pressure, the nozzle of the tube of the air-press should be held during the operation so loosely in the dilated end of the catheter, that there may be room for air to regurgitate;² and likewise, that instead of sending in the air by *douches* or charges—it should be transmitted in a gentle and continued stream.

Another circumstance, which shows the importance of care, is the fact, that the mucous membrane may be ruptured, and serious emphysematous tumefaction be occasioned.

It is proper, moreover, to observe, that the results of 258 cases, treated by Itard³, are far from encouraging. Of these, but two cases of cure are said to have been effected, and in this result, according to Itard, other causes concurred; whence he infers, first, that as a means of exploring obstructions of the tympanum by the crepitation, which often accompanies them, *douches* of air can afford no certain index; and secondly, that as a mechanical agent for deterging or evacuating obstructing matters, they can only dislodge and force them together; and, consequently, that both in the second and first point of view, *douches* of air do not deserve the confidence of the profession.⁴

The *vapour of acetous ether* has recently been injected into the middle ear, in cases of nervous deafness, of which Kramer⁵ makes two varieties, noise in the ear constituting the essential point of difference between them. The noise in the ear belongs, without exception, to the *erethitic* form, whilst it is foreign to the *torpid*. In cases of nervous deafness, Itard proposed to introduce ethereous vapour through the catheter, and to generate this vapour in an apparatus, in which the ether is dropped on a saucer of red hot iron, by the heat of which it is vapourised. The ether is, however, decomposed in this manner, so that it is not ethereous vapour, which enters the tympanum, but an acrid very irritating kind of gas, which,

¹ London Med. Gazette, July 6, 1839, p. 538, and American Medical Intelligencer, Aug. 15, 1839, p. 150.

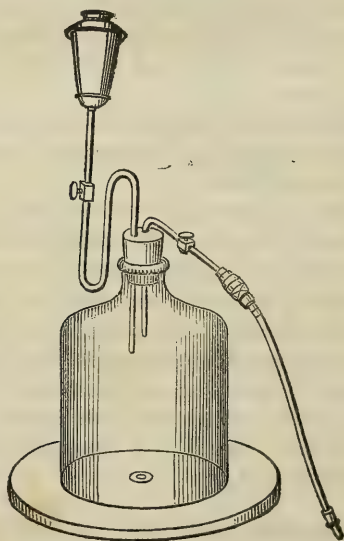
² British and Foreign Medical Review, July, 1839, p. 95.

³ Op. citat.

⁴ See, on this subject, Mr. T. Wharton Jones, in Lond. Med. Gaz., Aug. 3 & 10, 1839.

⁵ Op. citat. 211.

according to Kramer, is well suited to the torpid form of nervous deafness, but is positively injurious in the erethitic variety. He considers the attempt to vapourise acetous ether in a flask, placed in warm water, and connected by means of a tube with the cavity of the tympanum, to belong to the same class of methods, which act in too irritating and injurious a manner, owing to the vapour being given off far too rapidly. This inconvenience he proposes to remedy, in the erethitic form of nervous deafness, in the following way. A large glass flask—represented in the accompanying figure—holding about ten quarts is firmly and closely



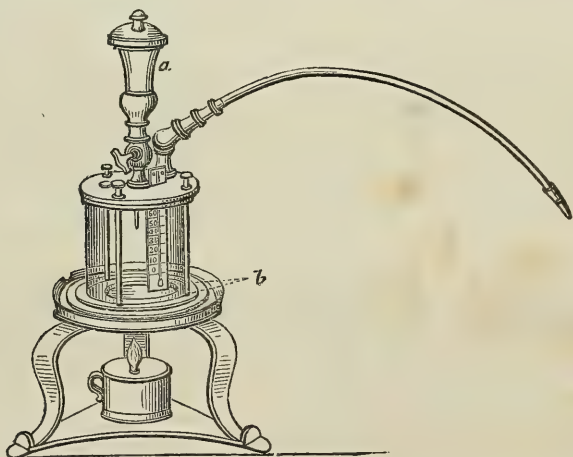
stopped with a cork through which are passed two brass tubes, each provided with a cock; one of these tubes is connected above with a funnel for dropping in the fluid, and the other with an air-tight tube to conduct the vapour, generated and inclosed within the flask, into the cavity of the tympanum. When the apparatus is to be used, the cork is to be firmly fixed into the neck of the flask, with the two tubes attached, and the cocks closed; the proper quantity of ether is then to be poured into the funnel, and forced into the flask by a gentle expiration, where it is converted into thin vapour at the ordinary temperature of the room. This vapour fills the interior of the flask equably, and is, indeed, in a state of slight condensation, so that when the metallic tip of the tube is connected with the catheter, and the cock is opened, the vapour issues with a whizzing sound.

Having previously introduced the catheter, through the nose, into the mouth of the Eustachian tube, and placed it in connection with the tube

of the vapour apparatus, the patient is to sit near a table, and leaning his arm upon it, with the corresponding hand he is to hold the tube of the apparatus, in such a manner that it may remain in close connection with the catheter. Each sitting occupies a quarter of an hour, and is repeated daily, applying the vapour alternately to the right and to the left ear.

It is unnecessary to make use of warm water to pour into the flask, as the ordinary temperature of the room is sufficient to vapourise the ether.

In the *torpid* form of nervous deafness this method of procedure does not answer, owing to the necessity of greater excitement than it is capable of effecting. In such case, a modification of the apparatus of Itard has been proposed by Kramer. In consequence of the metallic saucer in Itard's becoming cool more than once during a single sitting, and requiring to be exchanged for a hot one; as a necessary consequence the temperature of the vapour generated never remains, for a moment, the same, but varies extremely; immediately after the insertion of the red-hot saucer, the vapour issues burning hot into the ear, and, in a few minutes sinks to a very low temperature. These evils Kramer proposes to rectify in the following manner. The floor on which the bell-glass of the apparatus rests is substituted by a thin metal plate, which is warmed,



at pleasure, by an oil lamp placed beneath, so that the ethereous fluid falling on it is thus conducted through the catheter into the middle ear. Through the cover of the apparatus, a thermometer, with a metallic scale, passes down almost to the bottom, and indicates the temperature at which the ethereous vapour passes into the ear.

After a sitting or two—if the individual is to be benefited by the plan in either form of deafness, an improvement ought to be perceptible.

This course of treatment, aided, occasionally, by attention to the state

of the system, has, in Krämer's hands, been attended with satisfactory results, and has been adopted with advantage by others with a more or less modified apparatus.¹

The only published case, in this country, of the successful application of the acetous ether in erethitic deafness, is by Dr. Bolton, of Richmond, Virginia.² The hearing distance was amazingly improved by it, and the success far exceeded the operator's most sanguine expectations.

The vapour proves, however, at times too irritating, or occasions results by no means to be desired. The Author was applied to in one case in consequence of inflammation having supervened in the mucous membrane, which subsequently extended, in the erysipelatous form, over the cutaneous surface. It yielded, however, to appropriate treatment.

¹ Pilcher, *Op. cit.* p. 318.

² *American Medical Intelligencer*, April 1, 1839, p. 1.

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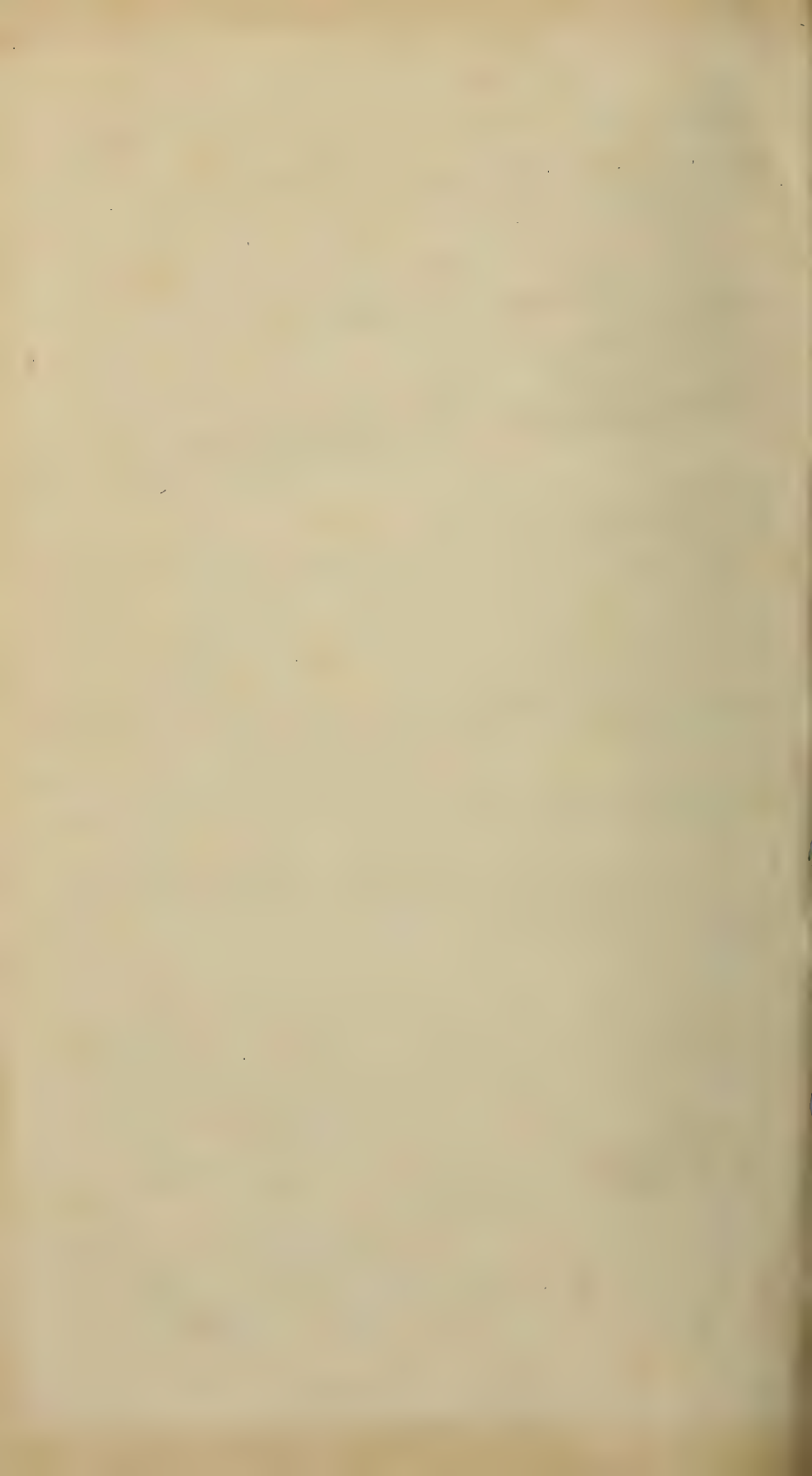
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